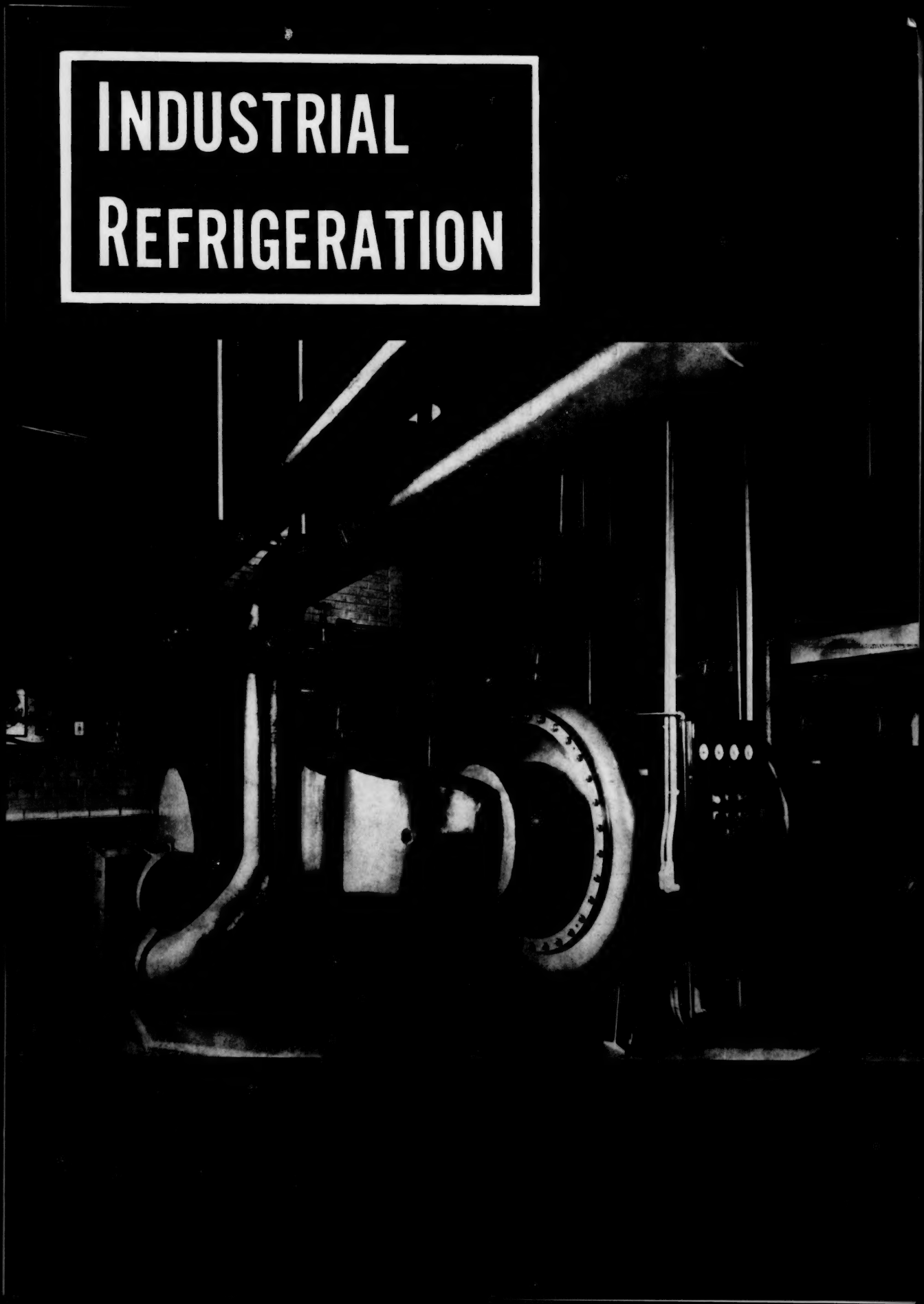
INDUSTRIAL REFRIGERATION



South of the Border

200 tons daily capacity

TUBE-ICE MACHINES

INSTALLATION

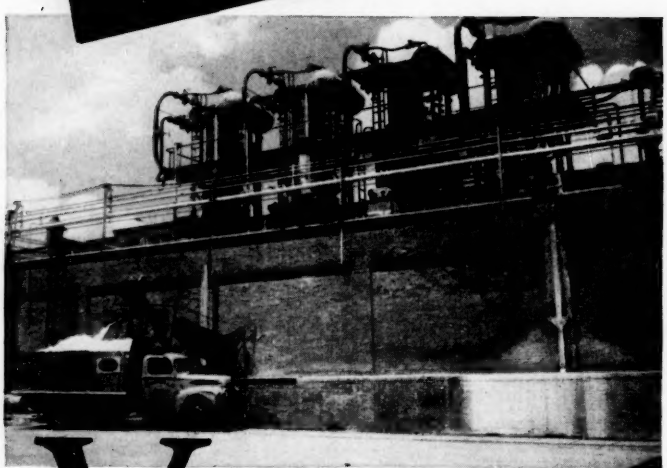
for **Cerveceria Cuauhtemoc, S. A.**

Monterrey, Mexico

This leading Mexican brewery installed two Vogt Tube-Ice Machines to serve their Monterrey plant several years ago, and two additional units were recently placed in operation to meet increased plant production.

Mounted on top of the ice storage building, a total of 200 tons of crushed Tube-Ice is discharged daily from the battery of ice machines to the storage room beneath. The ice is used for keeping beer cool during delivery by trucks and is supplied free of cost to refreshment stands and beer gardens where the product of Cerveceria Cuauhtemoc is sold.

In addition to making ice, distinctly versatile Tube-Ice units can be easily adapted to the production of cold water for wort cooling in any brewery. Write for Bulletin TI-3. Dept. 24A-RIIR.



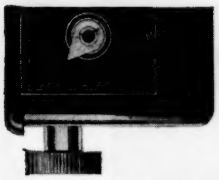
HENRY VOGT MACHINE CO., Louisville, Ky.
BRANCH OFFICES:
New York • Philadelphia • Chicago • Cleveland
St. Louis • Cincinnati • Dallas • Charleston, W. Va.
San Francisco

Vogt *Automatic* TUBE-ICE MACHINES

ELECTRIC Heating Cable DEFROSTERS

for LOW TEMPERATURE DOORS

1 • Temperature adjustment control.



2 • Adjustable thermostat for range of +85° to +245° F.

3 • Steel electrical outlet box for making connection between heating element and thermostat—inlet for power.

4 • Rabbeted channels into casing.

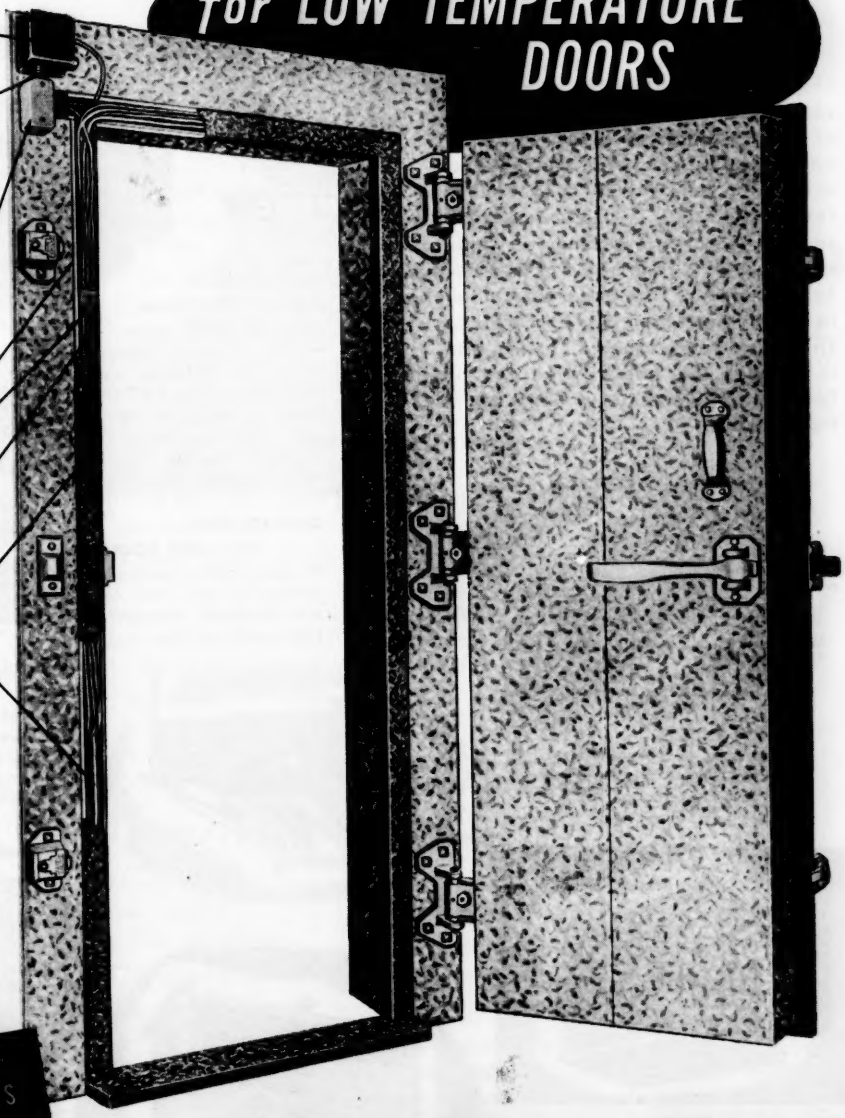
5 • Fireproof No. 26 gauge galvanized metal lined inside channel.

6 • Lead covered "heater cables" (4) held down securely by clips —approximately 20 watts to a foot. (110 volts—60 cycles).

7 • No. 10 gauge galvanized steel cover plates—removable.

8 • Capillary tube controls (on and off) thermostat.

The purpose of heating cables is to prevent icing conditions at the frame and sill areas where the door gaskets make their contact. The cables which are recessed into the frame casing are electrically heated and controlled by a "calibrated thermostat" (new improved feature by Butcher Boy), adjustable above the "dew point" of the air temperature. Since the heat expended prevents condensation it thus prevents freezing conditions.



"Butcher Boy"

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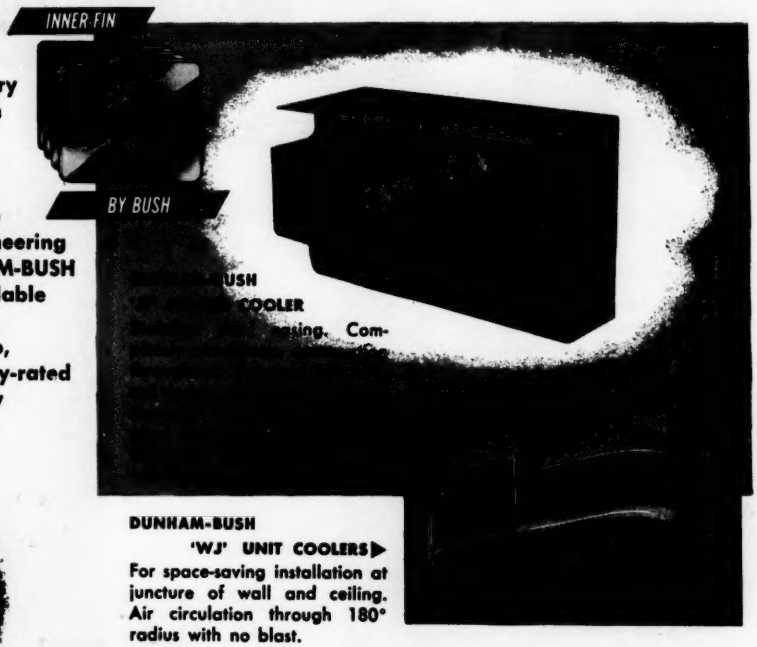
City_____ State_____

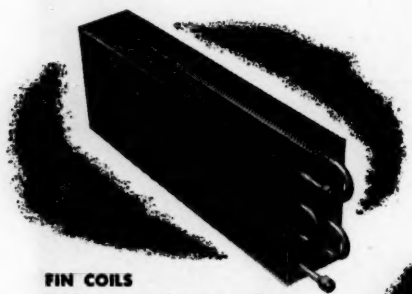
The Complete Line . . . DUNHAM-BUSH

. . . A BONUS TO REFRIGERATION CONTRACTORS

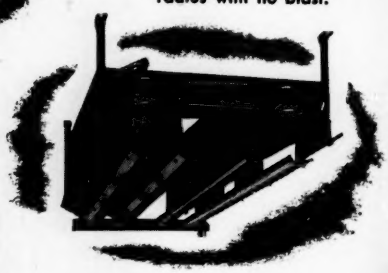
There's a DUNHAM-BUSH unit for every commercial refrigeration need — high or low temperature. To service engineers and contractors this means a bonus in time saved "shopping" for the right unit . . . installation time saved by knowing the line . . . engineering costs shaved with the help of DUNHAM-BUSH Sales Engineers who are always available to assist in selection and application. There's a "peace-of-mind" bonus, also, in knowing that latest design, reliably-rated DUNHAM-BUSH units cut down costly trouble calls.



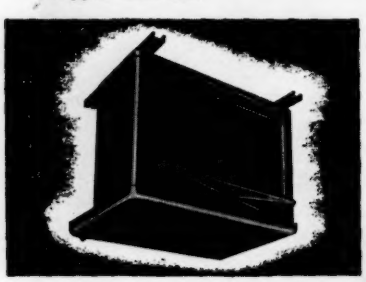
DUNHAM-BUSH
'WJ' UNIT COOLERS ▶
For space-saving installation at juncture of wall and ceiling. Air circulation through 180° radius with no blast.



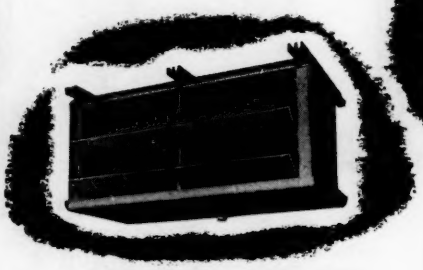
FIN COILS
Wide range of types and sizes to meet diverse requirements. Aluminum fins on copper tubing. Copper Inner-Fins.



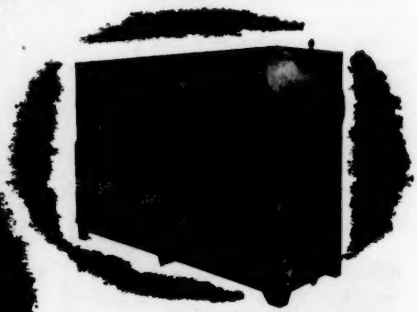
◀ DUNHAM-BUSH
PLASTI-COOLERS
Jet black plastic baffles eliminate sweating. Baffles pitched for gentle, gravity-type air flow that provides maximum circulation without blast.



'HG' HOT GAS DEFROST UNITS
'ED' ELECTRIC DEFROST UNITS
Inner-Fin coil construction permits rapid defrosting *from the inside*. No reboilers, complicated piping, other "extras".



'UC' STANDARD UNIT COOLERS
Ten models to meet any application need. Aluminum fins on copper tubing. Slotted hangers for quick installation.



'GD' GLYCOL DEFROST UNITS
Product coolers featuring Inner-Fin coils that permit *entirely separate* defrosting circuit. Available in floor or ceiling models. Assembled defrost circuit kit supplied.

DUNHAM-BUSH

Dunham-Bush, Inc.

WEST HARTFORD 10 • CONNECTICUT • U. S. A.

AIR CONDITIONING, REFRIGERATION, HEATING PRODUCTS AND ACCESSORIES

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STAND-OUT

Refrigeration Preserves Aircraft Metals

THE freezer has become just as important to America's great aircraft industry as it has to milady's American household—and, for precisely the same reason—protecting perishables against spoilage, says a recent issue of "Planes," publication of the Aircraft Association of America.

But, while the housewife uses her kitchen freezer to preserve vegetables and other foodstuffs against spoilage, these supercold refrigerators are used in the manufacture of a giant bomber to safeguard aluminum against spoilage.

Aircraft aluminum, before machining, is as perishable in its own way as a market basket of vegetables. Time is the most important factor concerning aircraft aluminum prior to its being shaped into airplane parts. If allowed to remain in storage in its raw state for more than four days, even at room temperature, the metal becomes age hardened to a point where microscopic fractures occur during the forming process.

On arrival at the aircraft plant, to insure that the aluminum remains in a "fresh from the market" condition until time for its use, it is first heated and then stored immediately in a freezer at a temperature of 10 degrees below zero.

Process Preserves Aluminum

This process literally preserves the aluminum in a fresh and workable condition. However, just as the housewife knows perishables can only be preserved just so long even in "deepfreeze," this is true also in the case of aluminum. If aluminum remains in cold storage beyond 30 days, age hardening again takes its toll. If it must be stored beyond that time limit, the aluminum is returned to the manufacturer for remelting.

What is of even more importance in the precise and careful handling of the aluminum slated for one of America's giant bombers is that once the metal is removed from the freezer it must be shaped within 15 minutes. Beyond that time it loses its workability. Once shaped on huge stretch hydropresses, however, the metal's "spoilage" is no longer a factor. Age hardening thereafter works to the good of the airplane in that the metal just becomes more durable.

Industrial Refrigeration

formerly ICE AND REFRIGERATION
Now in its 65th Year of Publication

J. F. NICKERSON, FOUNDER

Vol. 131 December, 1956 Number 6

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The Cover:

This automatic hermetic centrifugal supplies 322 tons of refrigeration for the carding and spinning departments at Highland Park Mill, Charlotte, N.C. A central-station refrigeration and air cleaning system was installed for the primary purpose of keeping the yarn clean. The water chiller sends 1,000 gallons of water per minute at 46.6 F to the air washers. See Story on page 14.

Published Monthly by NICKERSON & COLLINS CO.

General Offices: 433 N. Waller Ave., Chicago 44, Ill. Telephones: AUstin 7-1303-04-05

H. T. McDERMOTT, EDITOR AND PUBLISHER — E. R. CURRY, MANAGING EDITOR — J. R. KELAHAN, TECHNICAL EDITOR — H. D. BUSBY, ASSOCIATE EDITOR

ADVERTISING—O. RHODIUS ELOFSON, DIRECTOR — EDW. DAVIESON, Advertising Representative

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INDUSTRIAL REFRIGERATION, Vol. 131, No. 6 Published monthly at 433 N. Waller Ave., Chicago, Ill., U.S.A., by Nickerson & Collins Co. Yearly subscription in the U. S., $2.00 per year; other countries, $3.00. Single copies, 25 cents.

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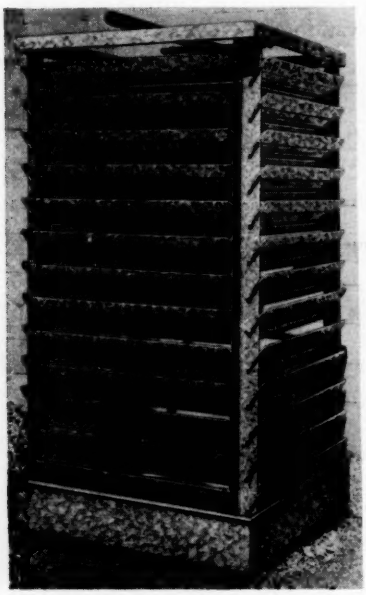
Industrial Refrigeration is indexed regularly by Engineering Index, Inc., and is microfilmed for library use by University Microfilms.

What's New

MACHINERY
APPLIANCES • PROCESSES

All-Steel Cooling Tower

A NATURAL draft all-steel cooling tower has been introduced by The Dover Manufacturing Company, Independence, Mo. It is held together with an adjustable tie rod that extends from the header pipe down to the center of the basin. The erection procedure is merely to fit four galvanized corner posts into corner



All Steel Packaged Cooling Tower Manufactured by Dover Manufacturing Company, Independence, Mo.

brackets in the basin, place the crown on top of the posts, place the header pipe into position and attach the adjustable tie rod. Once tightened, the tie rod holds the entire assembly together. Galvanized louvers are then slipped into the slots in the corner posts, and the tower is ready to be connected to the water piping system.

Being of all steel construction this tower will meet restrictions of municipal fire codes, with resulting economical insurance costs. All metal parts are hot dip galvanized to prevent rust, corrosion and unsightly appearance. It is available in capacities of 3 to 100 tons.

Wind Tunnel to Test Cars

A NEW wind tunnel is being constructed by The Ford Motor Co. as a part of the company's new Research and Engineering Center at Dearborn. Capable of devolping air speeds up to 125 miles per hour, the wind tunnel will show some of the effects high-speed driving will have on cars and trucks. From such test results, the engineering department will be able to develop more efficient aerodynamic shapes, better seals, and quieter interiors.

Burns and Roe of Michigan, Inc., is designing and engineering the new wind tunnel, large enough to test full-scale models. A single 20-ft fan, driven by a 2500-hp motor, will generate the desired air speeds, and a 2,000-ton refrigeration system will permit cooling the air for tests at any temperature down to zero (Fahrenheit). The air can also be heated up to 150 F to simulate "desert" driving conditions. The tunnel itself will be built of reinforced concrete and lined with a prefabricated sandwich of aluminum-faced cellular insulation. All seams will be vapor-proofed to permit close regulation of tunnel humidity and other specified test conditions. It is expected that the project will be completed late in the summer of 1957.

Plastic Conveyor Belts

NEW plastic conveyor belts are attacking one of the biggest production line headaches in the food industry and at the same time are providing a "new look" for many candy and ice cream products. Fabricated by joining two sheets of Du Pont's "Mylar" polyester film with a special white adhesive, this material is being used by companies in the candy, baking, and other food processing fields.

With more than 3,000 manufacturers using cooling-tunnel plastic conveyor belting at the rate of an estimated $1.5 million annually, the candy industry was quick to explore the possibilities of this new material. The material is being used also for plaques that convey candies on trays through multi-tier coolers. George Colejezzi, plant engineer, Stephen F. Whitman and Son, Philadelphia, reports that plaques of "Mylar" polyester film have improved the over-all process for chocolate candy manufacture. He said that plaques installed last October have provided consistently high gloss bottoms on the chocolate pieces. Also, the resistance of "Mylar" to cocoa butter greatly increases the service life of the plaque.

Foreman watches plaques made of "Mylar" polyester film being conveyed upward into multi-tiered cooler at Stephen F. Whitman and Son, Inc., Philadelphia.

Processors of citrus fruits also have hopes that this material will reduce the high replacement rate of present belting. Here, a belt needs to be strong and immune to attack by citrus acids. A frozen food manufacturer believes belting of "Mylar" will make possible a continuous production line involving freezing of food products at temperatures of minus 40 F.

Dyfoam New Insulating Material

DYFOAM, is a new plastic insulating material in a slab form, said to provide effective insulation at low erection costs, introduced by The Dyfoam Corp., New Castel, Pa. Chief advantage of Dyfoam, according to officials of the new corporation is its size. It is produced in continuous slabs up to any practical length. The slabs are 12 inches and 24 inches wide, and range from ½ inch to 8 inches or more in thickness.

Applying Dyfoam Slab in Position

In addition to its size, Dyfoam's low thermal conductivity (K-factor) of 24 to 40° mean; its light weight — .9-1.25 lbs./cu. ft., and water repellent qualities suit it for floors, walls, and ceilings of low temperature structures and transport.

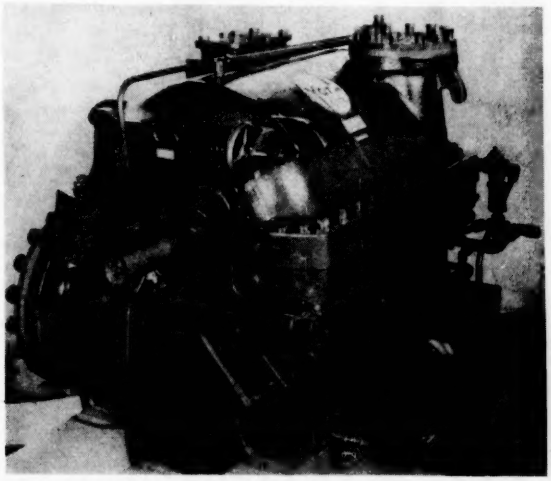
Raw material for Dyfoam is Dylite* expanded polystyrene produced by Koppers Company, Inc. These small cellular beads are expanded and forced together in an extrusion process to form a continuous slab of controllable density. The slabs are formed and cut to specified length, width, and thickness, and trimmed square on the edges.

Gage Glass Cleaning Rod

A NEWLY developed cleaning rod for cleaning the inside of gage glasses has been designed by Jerguson Gage & Valve Co., Somerville Mass. As described and illustrated with engineering drawing, this rod employs a tubular swab slipped over a piece of corrosion-resistant spring steel on the end of the rod, and has a device for setting the tension after inserting the rod in order to bring the swab snugly against the glass. Standard size available from stock is 36 inches long, with longer lengths made on order.

Multi-Stage Compressor By York

A NEW line of multi-stage centrifugal compressors for refrigeration applications was introduced in Chicago at the International Brewing Industries Exposition and the American Meat Institute convention by the York Corporation, a subsidiary of Borg-Warner.



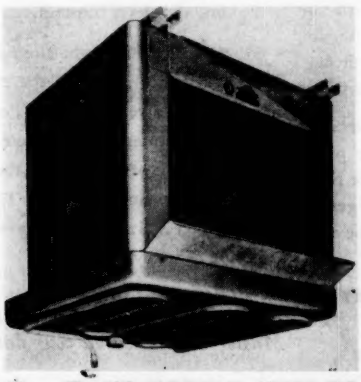
New Multi-Stage Centrifugal Compressor for refrigeration Applications Announced by The York Corporation.

The new compressors, in capacities from 100 to 4000 tons, feature simplified design with resulting economies in operation and maintenance. These additions to the York line extend the range of application of centrifugal compressors to higher and lower capacities than heretofore has been considered practical for this type of refrigerating equipment. Also, due to the compact design of the new compressors, it is now possible to use centrifugal machines in applications where previously only reciprocating compressors could be used.

York engineers say that the new compressors have approximately 400 fewer parts than any other conventional multi-stage refrigerating compressor, a factor which is expected to reduce maintenance expenditures considerably.

New Recold Ammonia Unit

A NEW RECOLD Ammonia Unit with Hot Gas Defrost Pan has been announced by Refrigeration Engineering, Inc. of Los Angeles. The unit was designed to meet the numerous requests for ammonia ceiling units where hot gas defrost is required.



New Recold Ammonia Unit with hot gas defrost pan

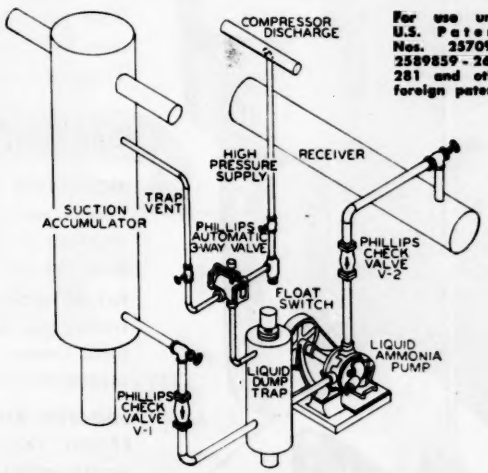
With a defrost coil on the pan, a low temperature ammonia unit is available for either flooded or direct expansion operation. The pan, defrost coil, cooling coil of steel fins and sheet tubes are all hot dipped galvanized after fabrication.

Ammonia "Slop-Over" Handled Automatically by PHILLIPS Liquid Return System

Protects Compressors, Saves Power, Makes Defrosting and Maintenance Simpler

Even in the best designed refrigeration systems, ammonia "slop-over" is a common occurrence. Two stage compression systems, booster systems and control ammonia compression systems subject to fast temperature and pressure changes are especially likely to have liquid in suction lines. This condition can seriously damage compressors which should handle dry gasses only.

Engineers at H. A. Phillips & Co. have devised a system that automatically returns "slop-over" directly to the receiver without regenerating and re-condensing the liquid. As shown in the drawing below, the Phillips Liquid Return System takes liquid ammonia which has collected in the accumulator, drains it through an outlet valve and check valve (V-1) into a liquid trap. Drainage occurs when the trap is at a low pressure. The trap is vented to the accumulator through a three-way valve and vent line. As the trap fills, a float switch is activated, energizing a three-way valve. This valve closes the vent line and connects the compressor discharge to the trap. Pressure builds up in the trap and closes check valve V-1. Pressure in the trap then reaches the same pressure as the receiver, opening check valve V-2 and allowing gravity to carry the liquid to the receiver. If gravity flow is not possible, a liquid ammonia pump is used. High pressure at both the pump inlet and outlet prevents flashing the liquid into gas. When the liquid trap is empty, the three-way valve is de-energized, closing the high pressure line to the trap. The trap is again vented to the accumulator, allowing liquid to drain once again into the trap.



Phillips Liquid Return System

This arrangement is highly efficient since only one pound of compression gas is required to move 25 pounds of liquid. There is practically no loss of refrigeration potential of the recovered liquid. The system also permits oil flushed into the accumulator to be easily drained.

A number of "packaged" variations of this system in capacities to 1000-tons are available to handle all arrangements of accumulator and receiver locations. For full details, write . . .

PHILLIPS

H. A. PHILLIPS & CO.
DESIGNERS AND ENGINEERS
REFRIGERATION CONTROL SYSTEMS
3255 W. Carroll Ave. • Chicago 24, Illinois

SPORLAN LEVEL MASTER CONTROL

LMC

is the

PEAK PERFORMANCE Answer to all FLOODED SYSTEMS

Here's why!

Because only the Sporlan Level-Master Control uses standard Sporlan thermostatic expansion valves with matching level-master elements. This perfect combination of LMC element and thermostatic expansion valve assures a positive liquid level control for Ammonia and Freon 12 up to 100 Tons . . . and for Freon 22, up to 180 Tons.

MODULATED FLOW. The Level-Master Control provides a modulated flow and maintains practically a static liquid level in the low side.

NO MOVING PARTS. The insert bulb controlling the liquid level has no moving parts. Control does not operate through use of a mechanical float device of any kind.

SIMPLIFIED AND ECONOMICAL INSTALLATION. The insert bulb can be placed directly in the shell, accumulator or liquid leg for direct contact with refrigerant. Existing float control systems can be easily and economically converted.

NOT AFFECTED BY TURBULENCE. Regardless of any agitation which might occur in the low side, the effect on the Level-Master is merely that of striking a mean level and holding that level constant.

TIGHT CLOSING. Tight closing is assured by the spring action in the thermostatic expansion valve during shut-down periods when the heater element is off and liquid refrigerant is in contact with the bulb. The Peak Performance of Sporlan Thermostatic Expansion Valves has been proven over a period of many years.

Write for Sporlan Bulletin 60-15 today.
Then you'll be sure to use the Sporlan Level-Master Control on all your flooded jobs.

SPORLAN VALVE COMPANY

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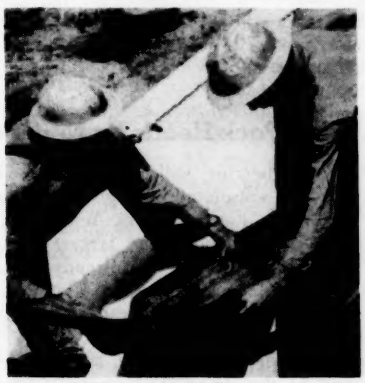
EXPORT DEPT. AD AURIEMA INC. • 89 BROAD STREET, NEW YORK 4, N.Y.

New Plastic Insulation

DEVELOPMENT of a new, flexible foamed plastic sheet insulation that adapts itself to curved or irregular surfaces with little or no fitting or cutting has been announced by the Armstrong Cork Company. Called Armaflex Sheet Insulation, the new product is formed from the same basic material as Armaflex Pipe Covering, which has gained wide use in the air-conditioning field since its introduction two years ago.

Applying Armalite in a cold room by the cold erection method.

The flexibility of the new sheet form Armaflex makes it particularly adaptable to insulating large tanks, irregularly shaped vessels, oversize pipes and refrigeration and air-conditioning equipment. The material will withstand temperatures as high as 160 F., with no limitation at the low end of the temperature scale, since thickness can be built up by applying successive layers. Armaflex sheets have a k factor of 0.28 at 75 F. mean temperature and a water vapor permeability of 0.1 perm. They are available in thicknesses of ⅛, ¼, ½ and ¾ inches in sheets 30 x 36 inches.



Flat, flexible sheets of foamed plastic insulation require little or no cutting or fitting when applied to irregular surfaces.

The foamed plastic sheets are applied to almost any clean, dry surface with an adhesive supplied by Armstrong and do not require any mechanical supports, or any other sundry materials. No vapor barrier is necessary, but it is recommended that outside installations be protected by an application of aluminum or asphalt paint, or Armstrong Insulcolor.

Another rigid foamed plastic insulation board is designed for use in refrigerated truck and trailer bodies, in cold rooms and other refrigeration installations, known as Amalite. It is applied by the cold erection method and multiple layer construction is recommended. This new insulation is available in boards two, three and four inches thick in 12 x 36 inch size for cold rooms and 36 x 36 inches for insulating refrigerated equipment, truck and trailer bodies.

SHANK
AMMONIA VALVES

Rugged and Accurate Construction
For Long-Life and Dependability!

Largest Line of Ammonia All-Steel Cadmium Plated Bar Stock Valves in the Industry

IMMEDIATE DELIVERY
ON OUR COMPLETE LINE

ALL-STEEL GAUGE SETS

Automatically shut-off liquid in case of glass breakage.

For Ammonia, Freon and Methyl Chloride.

All parts are rust-proofed by plating. Valve stems are packed with composition packing rings which insure a long-life, no-leak seal.

RELIEF VALVES

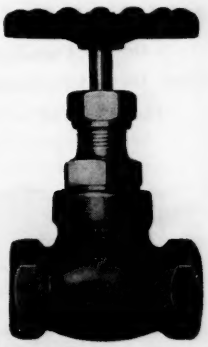
For Ammonia and Freon. Angle type, one-piece body with screwed ends and rust-proofed finish.

Positive relief action and reseating are assured by the design of the seat used. For ⅜", ½", ¾" and 1" pipe size.

SEMI-STEEL
SHUT-OFF VALVE

Made of highest grade, non-porous metal obtainable.

Double-seated stem is of rust-proofed steel. Valve ports are full size insuring maximum flow. Composition packing ring is impregnated with graphite for ease of operation and will not deteriorate in service.



Write for catalog.

CYRUS SHANK COMPANY

4650 West 12th Place, Chicago 50, Illinois

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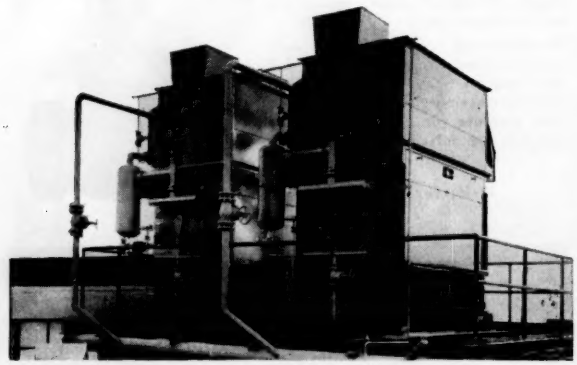


PRESS BRIEFS

Frozen Fruit Truckers Wir Exemption From I C C Regulations

TRUCKERS who transport frozen fruits and vegetables will be exempt from Interstate Commerce Commission regulation as the result of a Supreme Court action. The Court ruled that such frozen foods are agricultural commodities, not manufactured or processed goods, and therefore that their transportation is exempt under the Motor Carrier Act. Transportation of frozen fruits and vegetables is mainly performed by "for hire" truckers who are not otherwise subject to ICC licensing requirements.

The Court issued no formal opinion, but merely noted its affirmation of a lower court decision expressing this view in the case of ICC vs Home Transfer & Storage Co. Both the Association of American Railroads and the American Trucking Association had intervened in the case in an attempt to have the lower court ruling overturned.

Melting Ice Lowers Boy's Temperature For Heart Operation

THE first heart operation of its type has been performed on an 8-year old boy at Children's Hospital, Los Angeles, Calif. It required lowering of the boy's temperature for ten minutes from 98.6 to 88 F. This gave the surgeons a relatively bloodless field in which to operate during what developed into two major operations. Preparing for the operation, a tub of melting ice was used which brought his heart action down so low that it offered relatively a "dry field" for the most difficult part of the surgery. The boy, Daniel Ellison of Long Beach, Calif., was well on the road to recovery soon after the unusual operation.

Frozen Berry Pack Heads for New Peak

FROZEN strawberries will be available in greater quantities this season according to the National Association of Frozen Food Packers. With production not yet completed in California, the largest growing state, the total in the United States has already exceeded 200,000,000 pounds the association said. Last year's production was 273,000,000 pounds, at that time an all time high.

With consumer demand growing, strawberries are now frozen in half of the states of the country, but the vast majority are processed in California and the Pacific Northwest. Tennessee and Michigan are also large producers of the frozen berries.

Dutch Protest Sale of Surplus Poultry

THE DUTCH Government has protested to Washington against the sale in West Germany of 1.3 million kilograms of American surplus frozen poultry. The American Government announced on September 27 that it would subsidize these sales. The Netherlands Government believes this move is contrary to the FAO regulations on the sale of agricultural surplus. It fears the Dutch poultry trade in the traditional German market will be harmed. The Danish representative on the FAO Committee for Surplus Sales has supported the Netherlands protest.

Suez Crisis Revives Controls Talk

WAGE, price and materials controls are being talked about again in Washington as the Middle East crisis heightens. The Office of Defense Mobilization has on paper varying degrees of controls ready to be put into effect in accordance with the seriousness of any situation which may develop. Reportedly, these stand-by control plans are designed to cover any situation from a localized "police" action to all out atomic warfare and full mobilization.

As long as a year ago ODM made public the fact that it was working on plans for a War Transport Administration to control all forms of transportation, including Refrigerated Warehousing, in case of mobilization. More recently ODM was considering making public its drafts of Materials Controls Plans and possibly Wage and Price Controls draft orders also.

This idea was given up because of possible bad psychological and economical effects it might have. However some "experts" are now reporting on more information about controls. One headline says "Plans Set for Economic Controls." The story explains the existence of ODM stand-by controls on practically everything — and the fact that they are ready for imposition on our economy immediately, if necessary.

President Eisenhower has said that the United States would not involve itself in the Middle-East fighting, but experience has shown that the international situation can change suddenly. For business executives, this might be an appropriate time to take a look forward and see what kind of situation you might be in if economic controls were imposed sometime in the not too distant future. —NARW QuickSheet.

Empire State Building Completely Air Conditioned

THE final stage of an intricate project to provide air conditioning for all office workers in the world's tallest skyscraper, New York's Empire State Building, will be completed next spring, according to a news note.

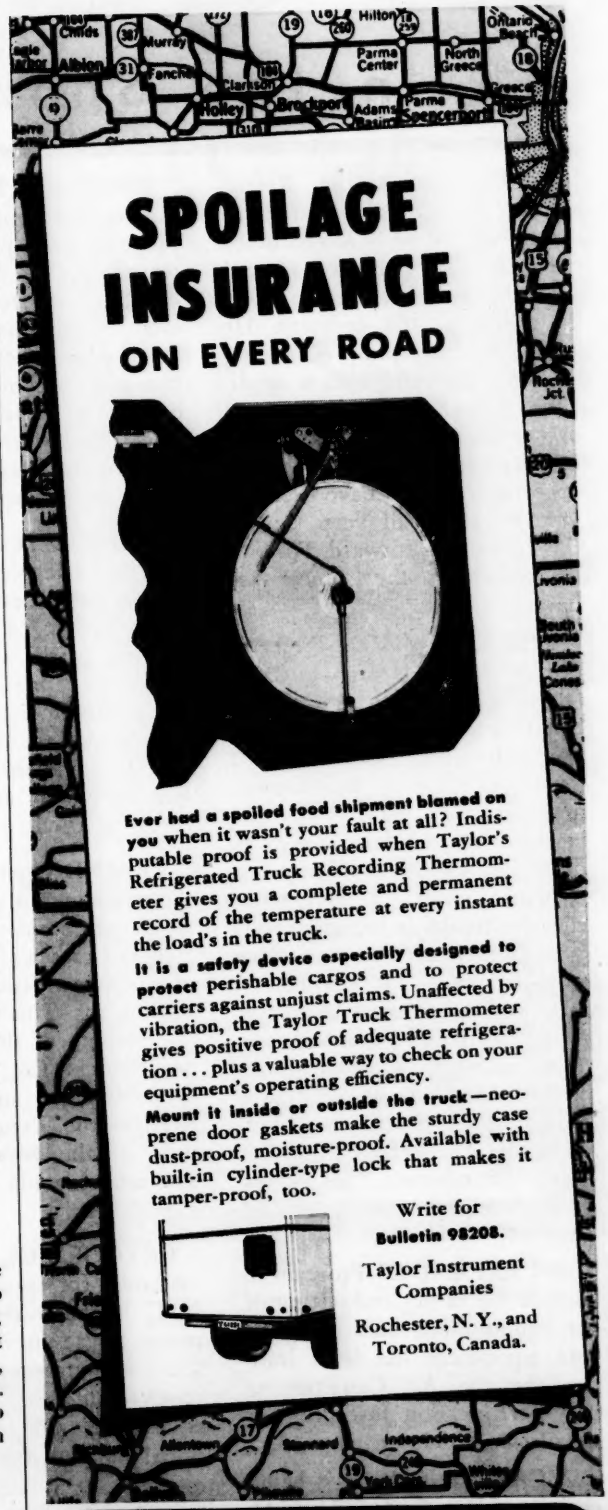
Two powerful compressors, providing a total of 3,350 tons of cooling will be added to the 1,900 ton capacity which now provides cooling for many Empire State tenants. The 5,250 tons of cooling capacity will handle air conditioning demands of all 25,000 tenants on the 85 office floors. Cooling of the 1,472-foot skyscraper began in 1951, with the second phase starting in 1953 and the final phase now in progress.

City Products Earnings Up

NET EARNINGS of City Products Corporation for the first nine months of 1956 were $3,355,930, equal to $2.69 a share. William J. Sinek, Chairman of the Board, said this was the best nine months showing in the last six years. It compared with $2,984,066, or $2.38 a share, for the same period in 1955, an increase of 13 percent. Net sales for the first nine months of 1956 increased to $69,803,674 from $62,396,118 for the like period in 1955.

Storage Increases Capacity

THE ROGERS Ice and Cold Storage Co. expects to double its local plant capacity for both freezing and storage, it has been announced. The new storage space, accommodating 4,000,000 pounds of frozen commodities, will increase the company's total storage capacity to about 8,500,000 pounds.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In the Spotlight

THE INDUSTRIAL Refrigeration industry as a whole can be considered to hold continued promise for steady future growth, says an executive closely allied to the industry. He points to the rapidly expanding demand for refrigeration applications, both old and new, and says that while near saturation has been achieved in some fields, other applications have been developed that will keep the industry moving forward. For full discussion of the subject see page 13.

THE RADIATION Preservation of Foods is attracting the attention of food scientists. Their opinion is that refrigeration and other means of food preservation will be supplemented rather than supplanted by this newer method, as well as other aids such as antibiotics and pasteurization, to achieve more effective results in keeping foods palatable, nutritious and free from spoilage. A canvass of facts and opinions of leaders in food research and industry, one object of which was to counteract the many extravagant claims regarding the process, was conducted by The Refrigeration Research Foundation. This survey is reviewed in article starting on page 15.

AN EXPANDED Program to include the rating and testing of air conditioning and refrigeration equipment has been initiated by the Air Conditioning and Refrigeration Institute. For details see article on page 18.

A CAR-ICING Plant is being constructed at Ogden, Utah by the Pacific Fruit Express Company. It will have capacity for icing 700 refrigerator cars. For details of the new plant see article on page 21.

REFRIGERATION is providing an increasing service for hospitals in food preservation, water cooling, ice making, air conditioning and storage of biologicals. In planning the modern hospital provisions for refrigeration and air conditioning should be given early consideration. The various factors of this subject are reviewed and discussed in the article starting on page 19.

A MODERN Creamery, operated by The Koontz Creamery Inc. in Northwest Baltimore operates a fleet of over 150 milk delivery trucks and 40 refrigerated trucks for supplying wholesale milk and dairy products. The trucks are cooled at night by direct-expansion ammonia. For additional details and pictures see article on page 22.

TRAINING of employees in the servicing, maintenance and repair of mechanically refrigerated rail cars will be carried on in a new instruction and demonstration car. This will be a joint undertaking of the Fruit Growers Express Co., the Western Fruit Express and Burlington Refrigerator Express. For pictures of the demonstration car and other details see article on page 23.

CRYOGENICS, the study of methods for producing ultracold temperatures and their practical use for industrial and scientific purposes is receiving renewed interest from scientists. A Cryogenic Congress at the National Bureau of Standards Laboratories at Boulder, Colorado brought out additional facts. For a brief review of the conference see page 26.

SERVICE and maintenance were the feature topics for discussion at the 47th Annual Convention of the National Association Practical Refrigerating Engineers at Detroit October 29 through November 2. Other subjects covered were developments in the industrial refrigeration and air conditioning fields. An important part were the exhibits where new, as well as standard equipment was on display. A chapter clinic created much interest at one of the business sessions. Outside attractions included a tour of the General Motors Technical Center and inspection of the Fruit Growers Express instruction and demonstration car. For detailed report see article starting on page 27.

A MOBILE REEFER has been designed for shipping less than carload lots of refrigerated meat from packer to retail store. Meat may be prepacked for a specific delivery route at the packing plant and held in the original refrigerated units at a constant temperature until delivery. For details see page 25.

THE "GIL EANNES," a new Portugese ship is fully equipped with modern refrigeration for carrying fish cargo for Portugese fishing fleets. Three large refrigerated holds carry frozen fish bait and frozen transport of frozen fish. For description of refrigerating equipment and pictures, see page 40.

CONTRACT has been placed for installation of an air conditioning system in the New York International Airport's projected "Terminal City." It will be made up of absorption refrigeration units which use heat to produce cooling. For description of the system see article on page 44.

CUSTOMER Preference for fresh rather than frozen fishery products has been made the subject of a study by the Fishery Products Laboratory of the U. S. Fish and Wildlife Service. For report on this investigation, see article on page 24.

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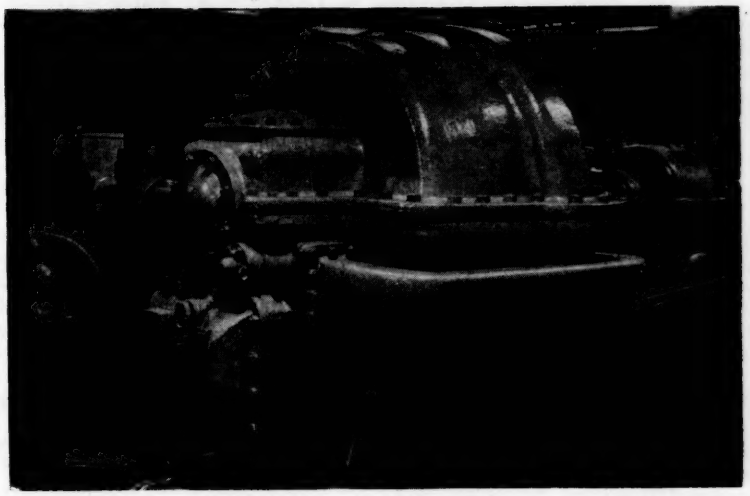
Trends Forecast Growth of Refrigeration

Writing in a business newspaper, an executive of a company closely allied to industrial refrigeration calls attention to the rapidly expanding demand for refrigeration applications, both old and new. While near saturation has been achieved in some fields, other applications have been developed to keep the industry moving forward, he says, and as a whole it can be considered to hold continued bright promise for steady growth.



Refrigeration Compressor at Humboldt office of Illinois Bell Telephone

GROWTH in the refrigeration industry has been impressive but futures growth will come primarily from new refrigeration applications according to Harold L. Robbins, Allied Chemical & Dye Corp. in an article in the New York Journal of Commerce. Near saturation has been accomplished in the field of household refrigeration and sales have leveled off; other applications have, however, been developed to keep the industry moving forward, he says.

The rapid growth of the refrigeration industry can be traced to the introduction of fluorinated hydrocarbon gases as refrigerants a quarter of a century ago. Non-poisonous, nonflammable, easy to handle, safe and stable, they did much to make possible the efficient, economical compact refrigeration and air conditioning equipment everyone knows today.

Equally important, though, has been the development of efficient insulating materials, applications of advanced engineering techniques in design and manufacturing steps, plus intelligent search for new applications and "hard selling" practices.

Refrigerant sales are expected to keep pace with the growth of industry as a whole. In fact, the newer forms, with their low freezing points, have sparked many of the ultra-low temperature applications that are receiving increased attention today. The supply of refrigerant gases is adequate for all foreseeable demands, both those already established and the newer materials just reaching commercial acceptance.

A recent survey showed that 60 percent of all metal-working plants even now consider hot weather a production and efficiency problem. While 62 percent of the offices of metal working plants were at least partly air conditioned, the plant percentage was far lower.

Leading the nation was New England, with 23 percent of its metal-working plants all or partly air conditioned. The south Atlantic and East South Central followed with 21 percent each. The Pacific Coast had 18 percent, East North Central 12 percent; and so on down to virtually none in the Mountain States.

Heavy Initial Cost Will Be Absorbed

Basically, because of the size of the units and the heat problems involved, when industrial air conditioning becomes generally acceptable, the costs will loom large in terms of initial outlays. But the investment, according to experts, will more than pay for itself through greater efficiency, lower absenteeism, and lower turn-over rates.

In many industrial applications, air conditioning adds directly to production efficiency. For example, in printing, heat and humidity cause paper to curl, or shrink, and wastage is substantial. As a straight business investment, without regard to comfort, many printers and lithographers air condition their plants.

Uses of refrigeration for transportation and storage may be expected to show further growth over the next several years. Mechanically refrigerated cars have already made their appearance in volume. As of March 1, 1956, 2,386 mechanically refrigerated cars were in service or on order.

Refrigerated Foods

Three and a half billion pounds of frozen food, the total growing every year, provide the impetus for the change to refrigerated cars. To store this food, freezer space capacity in public refrigerated warehouses has been increased about 15 percent per year over the past 17 years. The trend is expected to continue, though at a reduced average rate.

Other refrigeration uses are spreading. Temporary storage of milk by farmers in bulk cooling tanks until pick-up time is growing. In October 1954, 200 were in use in Indiana, a year later, 600. About 75 percent of the milk from the Seattle milkshed presently comes from farms where bulk coolers are in use.

Tests run at Washington State College indicate that egg farmers can realize a 200 percent return on refrigeration costs by cooling eggs and keeping them cool from the time they are gathered until sold because the eggs grade higher. The cost of the refrigeration unit itself can be paid for in a year or two of operation.

A 650-page book has recently been published, in cooperation with the Food and Agricultural Organization of the United Nations, discussing

in detail the refrigeration, freezing and processing of fish at sea. Some 140 naval architects, engineers, refrigeration experts, food technologists, boat builders and others contributed to the book entitled, "Freezing Fish at Sea."

Many Industrial Uses

Given man's imagination and ingenuity, the industrial applications of refrigeration are broad, indeed, albeit specialized and individually small in scope. Halftone and line cut engravings, that formerly took 45 minutes to 90 minutes, can be made by means of a refrigerated acid bath in from 3 to 7 minutes. Precision boring is more accurate because oil, cooled by refrigeration, controls heat in the drilling and allows tolerances as low as .0005 inch. Tool steel, it has been found, can be cured in sub-zero temperatures as low as minus 120 degrees Fahrenheit to a hardness that formerly took years to reach.

An ingenious application of refrigeration was employed by a Canadian rock salt mine in Ontario. Most of the 720 feet to the salt deposit was through water bearing rock. Wondering how to avoid flooding the shaft, the engineers hit on the idea of freezing a core of earth to stop the flow of water. Twenty-eight 10-inch holes were drilled in a circle. Refrigerant was circulated through the holes until the core froze solid. Protected from the flow of water, digging out the shaft and lining it with concrete became a routine operation.

Complex metal castings are made quickly and easily with the aid of refrigeration too. Mercury, a liquid at room temperatures, is poured into steel dies and frozen to a pattern of the part to be made. At sub-zero temperatures, the pattern is covered with ceramic clay to form the mold. The mercury is melted out, and the mold is ready for casting.

Research in refrigeration is continuing to discover new and better products. New fluorinated hydrocarbons like trifluoromethane can safely bring temperatures down to minus 100 degrees Fahrenheit, and tetrafluoromethane down to minus 150 degrees Fahrenheit.

Among the frontiers being investigated are very low temperatures where metals become super-conductors of electricity, almost all gases liquids, and common materials reveal new and strange properties. Better and more efficient refrigeration systems must be devised to cool the shells of planes and rockets travelling through the air at super-sonic speeds or they will burst into flames like meteors.

Super-Cold Temperatures

From another source comes the information that atom scientists are making increased use of super cold temperatures. At Oak Ridge, radiation damage at temperatures colder than minus 400 F is being studied. Such temperatures provide a slow motion picture of what happens to various metals when they are struck by high energy neutrons.

The scientists say they only have their foot in the door as far as industrial and commercial uses of low temperature are concerned. Many of the principles and applications are known, but there are a lot of engineering problems to overcome, says V. J. Johnson, Bureau of Standards Cryogenic engineer. For instance, there is no known lubricant for moving parts of such cold temperatures, although Garret Corporation recently has come up with a non-lubricated bearing that can be used at an ultra-cold temperature.

There is no doubt that in all its branches, in industry, and in commerce, the refrigeration industry as a whole can be considered to hold continued promise for steady growth. The industry and its suppliers, from producers of metal components, insulating materials and complex valve mechanisms to refrigerant gas manufacturers are completely equipped to meet present and future demands.

Air Conditioning in Textile Mill Keeps Yarn Clean

NO MATTER how carefully the yarn was spun, it was difficult to keep it clean at the Highland Park Manufacturing Company, Charlotte, N. C. *The answer* — 322 tons of Trane air conditioning equipment for a central-station refrigeration and air cleaning system for the textile mill.

For years soot- and smoke-laden air lowered quality in the carding and spinning departments of the mill, located in a highly industrialized area of Charlotte. During hot summer months employee absenteeism was above normal; and in winter, yarn, machinery, floor, and walls were subjected to carbon and tar deposits carried into the building by dirty outside air.

The installation of the refrigeration system, which supplies chilled water to air washers in both the carding and spinning departments turned the trick. Located in the basement of the mill, the Trane CenTraVac water chiller sends 1000 gallons of water per minute at 46.6 F. to the air washers. The chilled water is pumped to the air washers in the two rooms through insulated supply and return piping.

Water supply to the CenTraVac comes from a redwood, induced draft cooling tower. The tower provides 963 gallons of water per minute, cooling it from 95 F. to 85 F. when the outside air wet-bulb reading is 78 degrees.

A centrifugal fan with a maximum air volume capacity of 18,200 cubic feet per minute supplies the card room with 13,800 cubic feet of air per minute. For the spinning room, 60,000 cubic feet of air is supplied from the system which is capable of a maximum air delivery of 90,000 cubic feet per minute.

Temperature control the year around is kept at 80 F. dry-bulb and 50 per cent relative humidity when the outside temperature is 90 F. with a wet-bulb reading of 78 F.

These air washers, supplied with chilled water, provide clean, filtered air to the spinning department—Photo by Trane Co.

Radiation Sterilization of Foods—A Symposium of Reports from Food Scientists

A CANVASS of facts and opinions of leaders in research and industries regarding radiation of foods has been assembled by The Refrigeration Research Foundation, supplementing a similar survey made last year. One object of this undertaking was to counteract the many extravagant and unwarranted predictions about food radiation, especially the imminence and extent of its industrial adoption. At this time, near the end of 1956, the predictions of food scientists that the practical application of radiation preservation would be some years in the future, is being borne out; although research in this important technological field continues to make steady and interesting progress.

This current canvass is made up from the same and other research and industrial leaders to provide an estimate again, a year later, of the situation. From these observations, a conclusion is that radiation will not supplant or eliminate all other methods of food preservation, which has been the Foundation's viewpoint from the beginning. It is believed that refrigeration and other methods of food preservation will be supplemented by radiation as well as other aids, such as antibiotics, to achieve more effective results in keeping foods palatable, nutritious and free from spoilage for considerable periods of time. Essential economic and engineering details it is believed, must be studied and resolved before radiation of foods can attain significant and extended implementation in industry.

Developments Will Proceed

The Foundation holds that this indispensable sequence of development, which should be orderly and conservative, will most satisfactorily proceed, if it is free as possible from unwarranted propaganda and predictions, free from pressures on research workers to produce quick results, possibly at the cost of scientific accuracy, and free from attempts to startle rather than to inform the public mind. Facts and time only will determine whether the potential values of radiation in the food industries can be realized technologically and economically. The Foundation is, itself, sponsoring research on the refriegrated storage life of radiated foods and continues to be keenly interested in all aspects of the radiation of commodities.

Opinions of Scientists

Following are summaries of the opinions of selected typical comments which reflect the general tone of all replies.

Mr. John L. Harvey
U.S. Food and Drug Administration
Washington, D. C.

We are unaware that there has been significant technical achievement and our comment in the future or what the future may hold would be speculative. The outlook timewise is expressed by most as "a few years". I would translate this to mean perhaps three to five years. Much is still to be learned as to which products are suitable for irradiation. Presently there is doubt that milk and dairy products are suitable. Pork, haddock, potatoes, and some cereals show promise. Most other foods are in such early experimental phases as to warrant no guess.

There is much change in quality, including taste and odor, and in some items such as fresh fruits marked deterioration in texture and color. Flavor and odor changes and deterioration in pleasing appearance will militate significantly against public acceptance and as a practical matter will need to be overcome before commercialization. Perhaps the biggest holdup on commercialization is the need for much more testing on wholesomeness and these are the tests that require time. The present information about the effects of radiation on food is still so underdeveloped that each new proposal requires separate scrutiny.

Mr. Carlos A. Greenleaf
National Canners Association
Washington, D. C.

The most wholesome development during the last year has been the effort of people in the Quartermaster Corps, through talks and publications, to promote an understanding of the present status of radiation sterilization. They have been pretty objective, it seems to me, in pointing out the areas where they seem to be making progress and others where it is still slow, also in indicating where they think some early application is a possibility and where they think it is a long way off. A good example of this was the "U.S. Army Panel Discussion on Radiation Preservation of Food" April 17, 1956. (Note: A summary of this was published in the November INDUSTRIAL REFRIGERATION.)

Dr. Roger H. Lueck
American Can Co.
New York City.

Since I last wrote you on the subject, my thinking has changed somewhat as the result of more recent developments, but I am becoming more and more convinced that the potentials of irradiation or completely sterilized products is becoming dimmer and dimmer. There is no doubt but what sterilization can be effected by the use of this form of energy, but the side effects developed when complete sterilization is effected are presenting a most difficult hurdle.

On the other hand I am becoming convinced that there is a future for the surface sterilization of fresh products, and here I am referring to those which are sold in flexible film packages, either off the grocery shelf or out of the refrigerator. The dosage required for this type of sterilization, 75-150,000 REP, does not appear to induce serious side effects, and apparently does provide a shelf life from three to six weeks longer than is normally attained. This could have the effect of increasing the percentage of fresh foods in the total for the American food consumption at the expense of the frozen and canned products.

In addition to the above, I note now that the Food and Drug Administration has approved the presence of seven parts per million of aureomycin on products for human consumption. This together with some results that both we and the N. C. A. Laboratory are obtaining with antibiotics leads me to believe that these, too, may be used as a means of prolonging the life of fresh products and thereby decreasing the dependence on canned and frozen products.

Dr. Paul C. Wilbur
Food Machinery & Chemical Corp.
San Jose, Calif.

The significance of the relatively high resistance of dangerous food spoilage organisms to radiation does not appear to have yet been given adequate weight in proposed radiation dosage for hermetically sealed radiation sterilized foods. Higher dosages than those proposed may be advisable for completely sterilized hermetically sealed foods, with commensurate increases in the off flavor problem.

We are inclined to feel that radiation processing will be more apt to result in the production of new types and classes of food products rather than replacement of existing types. This has been the history of all of the great food preservation processes which have been developed. The complete inversion of the relative resistance of enzymes and spoilage organisms to radiation as compared with heat tends to strengthen this belief. We feel that the impact on commercial processing of sterile foods will, therefore, be felt some years in the future rather than immediately. Pasteurization and disinfestation at low dosage levels is apt, in our opinion, to reach commercialization before food sterilization.

Dr. L. E. Clifcorn
American Can Co.
Barrington, Ill.

Radiation treatment of foods for extension of shelf life by low dosage treatment or for the complete sterilization of some

products looks closer to reality than it did one year ago. However, extensive use of radiation for the sterilization of foods is limited by the few products that come through without off-flavor and the necessity for improved preservation methods for many others. On the latter point there is a marked distinction between military and civilian necessity. In regard to low dosage treatment of meats and fish for extension of refrigerator storage life, the writer believes commercial development is awaiting the approval of the Food and Drug Administration. Results to date indicate that there is no harmful psychological effect from radiation treated foods. The writer believes we may have some commercial low dosage applications to food in the next five years.

Radiation treatment of foods will not replace refrigeration nor should it materially reduce the volume of the food refrigeration business. Radiation should be looked upon as complementary rather than competitive with the refrigeration business.

Mr. John T. Knowles
Libby, McNeill & Libby
Chicago, Ill.

Due to intensive research during the past three years, the situation is changing from skepticism to optimism, particularly with respect to pasteurizing potentials with certain products. It has been well established that you can destroy bacteria by irradiation but you can pasteurize at much lower dosages.

The immediate future may see the application of pasteurization by irradiation with pork and poultry as an aid to or with refrigeration for increasing the storage life. For poultry there are some possibilities of several weeks storage life without refrigeration.

Dr. Ray B. Wakefield
Gerber Baby Foods
Fremont, Michigan

There has been a lot of activity since the first report and my reaction to the present status of radiation of foods. I believe the commercial application of radiation of certain foods with reference to pasteurization is quite close and will find commercial application soon. Sterilization of foods by radiation is still a long way off.

Dr. John H. Nair,
Thomas J. Lipton, Inc.,
Hoboken, New Jersey

It is my opinion that some forward steps have been taken during the past year in analyzing the potential contribution of radiation techniques to food preservation. It now seems indicated that radiation is not likely to replace other methods for the prolongation of the useful life of perishable foods, except in very limited circumstances. It promises to be a useful supplement to other means of food treatment. Dosages which can delay bacterial spoilage of luncheon meats for a limited period under refrigeration appear illustrative. The use of irradiation to inhibit the sprouting of potatoes looks promising. In contrast, the changes in flavor and color of foods which follow the application of sufficiently high dosages to give complete bacterial destruction are extremely limiting, unless very careful and expensive precautions are observed. While Enzymatic activity may be reduced by irradiation, the possibility of its complete inactivation dosages which are practical appears questionable.

Any general application of radiation to food looks to be quite some years away. Limited usage of such treatment may come somewhat sooner than I believed a year ago to be possible.

It is quite apparent that the food industry will need to continue to employ refrigeration, quick-freezing, sterilization by heat, dehydration, and other methods of food preservation for the foreseeable future. The application of radiation would be generally only supplemental.

Dr. M. J. Blish
Glutamate Manufacturers' Technical Committee
Phoenix, Arizona

Radiation of foods has produced some spectacular results that are of interest, regardless of actual merit or of economic considerations. Outlook for industrial use in the food industry seems quite limited and remote, at present and for some time to come, with the possible exception of some highly specialized items and requirements. I doubt that radiation will become a serious competitor of refrigeration and/or of canning in the near future if at all, unless there is some new and revolutionary development that cannot now be predicted.

Dr. John S. Andrews
General Mills, Inc.
Minneapolis, Minnesota.

The earlier wave of optimism about the irradiation of foods reflected by some news letters and journals appears to have been revived in recent issues. However, technological justification for these attitudes is still hard to find. No one has, as yet, announced any discovery which promises to minimize the adverse effects which high levels of irradiation have on foods. Without high levels complete sterilization and enzyme inactivation cannot be achieved. Thus, irradiation preservation still requires the assistance of other methods to keep these factors under control. At low levels of irradiation where adverse changes do not occur, the prevention of sprouting, the destruction of insects and the inactivation of molds offers special applications which promise to be of value in the preservation of some types of foods.

Col. Paul P. Logan
National Restaurant Association
Chicago, Illinois

Based upon the information we have received about the progress of food preservation by irradiation, we conclude that it may find a useful place within the next few years in the marketing of potatoes and certain types of grain and that its use will eventually be extended to more perishable products. It is my own personal opinion that it will never at any time displace the need for refrigeration. As a means of food preservation canning was not displayed by freezing; freezing was not displaced by dehydration; none of them will be displayed by chemical additives or antibiotics. Somewhere in the future, irradiation will find its rightful place.

Dr. George Garnatz,
Kroger Food Foundation
Cincinnati, Ohio.

I am not aware of any significant developments over and above those included in my remarks of last year except that if I interpret the signs correctly, interest seems to be on the increase and there seems to be a somewhat greater degree of optimism to the effect that applications to food processing will be forthcoming, in time, that will be practicable and competitive. From the standpoint of complete sterilization by radiation, such applications are perhaps 10 years in the offing.

Mr. Gerald A. Fitzgerald
Donalk K. Tressler and Associates
Westport, Connecticut

It is obvious that the use of irradiation and antibiotics will eventually become important in the distribution of perishables. I expect to see large volumes of partially sterilized fresh fruits and vegetables, meats, fish and other perishables handled satisfactorily under mild refrigeration (40 to 50 F). Foods presently handled under mild refrigeration may need only air-conditioning at 70 F. in the future. However, I do expect some refrigeration to be always an advantage during distribution of such partially sterilized perishables and a practical necessity during the preparatory stages.

In view of a research program now in the planning stage, a year from now we expect to know more about the preservation of fresh vegetables by irradiation alone and irradiation combined with refrigeration. Also, we will include antibiotics and other additives in our tests. If inhibition of respiration by irradiation or chemicals allows use of substantially hermetic containers of the order of polyethylene film, the present potential of refrigerated retail display cabinets for fresh fruits and vegetables may shrink considerably. However, present usage in this area is pretty small.

I believe, under a continued stable economy, that the production of frozen prepared foods will continue at a rapidly increasing rate during the development of irradiated foods. Some of them may actually be partially sterilized by irradiation. Under no circumstances would I trust such foods without refrigeration. With the help of irradiation, and/or antibiotics, I expect prepared foods may become terminal market operations using mild refrigeration instead of freezing. Also, I expect pre-packaged meats might be similarly handled as well as certain nonseasonable fruits and vegetables. The deciding factor in each instance will be the ultimate cost to the consumer compared with costs of distributing these products in the frozen state. For seasonable products like frozen peas, peaches, strawberries, etc., we will still need commercial freezing because I cannot visualize holding such irradiated foods from one season to the next without actually freezing them.

I expect to see food freezing continue to expand at a somewhat slower rate until it reaches a fairly stable plateau in about five years. By this time, most of the kinks will be smoothed out so that future ex-

pansion in preservation of perishables should be by the newer methods. Because irradiation about doubles the cost of plant investment, it should take at least 10 years before it is handling any appreciable portion of the business but still such expansion will require even greater amounts of refrigeration both in processing and in distribution.

Dr. R. L. Hiner
Agricultural Research Service,
Beltsville, Maryland

Treatment of meat and meat products with gamma radiation can materially increase the shelf life of fresh meats with little effect on color if the samples are kept in airtight packages. There are several problems to be solved before gamma radiation can be used successfully and on a commercial scale. (Probably five years or more).

I do not believe radiation of meat will replace refrigeration. After all, radiation should be considered as another means of preservation, the same as canning, freezing or curing. Radiation of meat cannot replace good sanitation and refrigeration of fresh meat.

Dr. Mogens Jul,
Meat Research Institute
Roskilde, Denmark

We do not feel that radiation can be applied in the Danish meat industry within the next five years. We do believe that radiation may play a role in say five to ten years from now in meat preservation. With our present knowledge, however, it does appear that the best prospects are in the field of pasteurization of meat for subsequent cold storage.

We believe that the chances are that radiation will make long time storage under refrigeration more feasible than it is today and that therefore the refrigeration industry should look with great interest at the prospects not as a competitor but rather as an ally to further use of food refrigeration especially in the field of storage above freezing.

Dr. E. O. Herreid
University of Illinois
Urbana, Illinois

Radiation treatment of milk has not been successful after 15 to 20 years of intensive research. It creates more problems than it solves, especially in the way of off-flavors, and it is ineffective in inactivating crucial enzymes. No one has reported being able to sterilize milk by irradiation that had acceptable palatability at zero time. It was not worth storing. If irradiation sterilization should eventually become commercially feasible, the indications are, that the resulting products will maintain better keeping qualities at low temperatures. Heat sterilization will, in all probability, be the order of the day for the indefinite future.

Charles Butler
U.S. Department of the Interior
Washington, D.C.

There still remains a lot of work to overcome the demonstrated development of pronouncedly undesirable odors and flavors in the use of this technique for the partial or complete preservation of the fishery products we have tested. The most promising field for fishery products still seems to revolve around some lesser dosage level designed to supply surface sterilization for fresh (iced) products. Thereafter they would be further protected by refrigeration to extend the so-called fresh shelf life of such products as fish, crabmeat, shrimp or lobster in either the raw, dressed, or the cooked state, but not processed and hermetically sealed.

Dr. C. Glen King
The Nutrition Foundation, Inc.
New York City, N. Y.

Progress toward practical utilization of radiation techniques has been definitely encouraging during the current year. It seems probable that within a few years radiation of a number of foods will be practical, at least in small scale installments for military use, primarily at lower dosages than are required for sterilization but with sufficient intensity to accomplish increased stability.

The purpose of radiation would, in some instances, be in the nature of inhibiting the development of eggs or small organisms such as weevils or deep-seated micro-organisms where penetration is important, and in other instances possibly for protection against sprouting, as in the case of potatoes.

There is a reasonable prospect that radiation followed by low temperature storage may be advantageous. There are still many technological problems to be ironed out, however, before we can expect major development. Complete sterilization still seems to be considerably in the distance because of undesirable secondary changes that affect either nutritive value or flavor and acceptance.

Dr. William H. Cook
National Research Council
Ottawa, Canada

My opinions on this question have not changed during the past year. There has been considerable scientific progress during the period and in fact, with the amount of money spent on this type of research, it would be a reflection on the quality of scientists if some progress had not been made. At times I personally wonder if they are not trying to hatch this particular egg in half the time with two hens. My prediction was that early applications would be limited to the lower dosage range. In my opinion this is where most progress has been made in the last year. Commercial applications are still decidedly limited. I also added that as far as high dosages were concerned, present methods of food preservation would not be displaced significantly by irradiation in the foreseeable future. As far as I can see, current commercial methods are still expanding and I know of no conventional factor that has been displaced by irradiation.

Dr. G. E . Hilbert,
U.S. Department of Agriculture
Washington, D. C.

We have watched very closely the developments being made in the field of irradiation of foods and now have a limited amount of work under way or planned on a number of commodities including eggs, potatoes, meat, nuts, etc. I would agree with many past views that the use of irradiation in food preservation to any appreciable extent is not imminent. . .

The early adoption of radiation as a food preservation aid will depend primarily, in my opinion, on two critical items only—(1) demonstration that the food so treated is safe and (2) the existence of a critical need for one or more food products in a form that cannot be obtained by processing means other than radiation. Compromises with respect to cost may be made under these circumstances. But only limited compromises with flavor defects would be tolerated.

Dr. Frank L. Gunderson,
Technical Consultant
Washington, D.C.

As a new form of "Pasteurization" I believe radiation sterilization will have increasing, although not world shocking or revolutionizing use. As to the outlook for industrial use, the beginning food applications will probably start within five years, but the more rapid trend in that direction will likely come from five to 15 years from now. All of this will be somewhat contingent on the proposed pilot plant which I believe the Quartermaster Corps will sponsor.

Dr. Reid T. Milner,
University of Illinois
Urbana, Illinois.

So far as I know, there have been no outstanding developments during the past year in the radiation of foods. Many new facts have been learned, more is known about the changes produced by radiation on foods, and there is less fear of toxic factors produced by radiation. In the near future pasteurizing doses of radiation will be tried on meats and the use of radiation to inhibit sprouting of potatoes and kill insects in grain may be done on a large enough scale to obtain valid cost figures.

Until much more work is done it is impossible to set a time for general industrial use of radiation on foods. It seems very doubtful that radiation will ever replace refrigeration or thermal processing as a method for food preservation. Refrigeration remains the best procedure for retaining quality during long storage. Even if radiation or antibiotics can be used to combat micro-organisms, refrigeration will be needed to maintain the original character of foods over a long period of time.

Dr. C. Olin Ball
Rutgers University
New Brunswick, New Jersey

Since the Refrigeration Research Foundation released its resume of facts and opinions on the advancement of food radiation in 1955, several significant reports have been issued by research workers in that field. The results of storage tests, applying to periods of from two to five years, are especially interesting. Vegetables and raw meats, which had been subjected to radiation dosage of from 1.5 to 3 million rep, invariably carried through the storage period the flavor effects that were produced during the irradiation treatment. In addition, when storage was at 70 F or higher, color usually deteriorated sharply.

These results certainly contribute no encouragement in respect to the prospects of successful sterilization of foods by ionizing

rays. On the contrary, such prospects seem to be growing dimmer with the accumulation of knowledge of the irradiation requirements for the destruction of bacterial spores. Dosage of 3 million rep, until recently considered to be adequate for sterilization, is now regarded by some workers as being scarcely more than half the dosage required to destroy spores of highly resistant microorganisms. . . It should be noted that the storage tests recently reported produced strong evidence that the stability of irradiated foods in respect to color will depend upon the temperature at which the foods are stored.

Dr. Zoltan I. Kertesz
Cornell University
Geneva, New York

I do not believe that radiation preservation can do much for the food processing field today. I believe that the progress made in the work on the fundamental aspects has been considerable. I would like to see more emphasis on the studies of the behavior of food constituents rather than on the extensive work on complete foods. My guess is that radiation can do little today for food preservation but that it will come in as a major approach in the future.

Dr. M. F. Gunderson,
C. A. Swanson & Sons
Omaha, Nebraska.

I am quite certain that radiation will sometime be a factor in food preservation. I do not believe that it will happen within five or ten years, although there may be some applications which will prove useful. Foods preserved by radiation can be recontaminated and spoiled, nevertheless, I believe that all forms of food preservation will have a place in the future. I also believe that, in many instances, foods sterilized by radiation will have their quality, texture, and appearance maintained by frozen storage.

W. T. Pentzer, Chief,
U.S. Department of Agriculture,
Washington, D.C.

The more I see of irradiation for fresh fruits and vegetables, the more it falls into the category of a possible supplement to refrigeration. In some cases, it will not be as good as a chemical treatment. There are some very broad claims being made for irradiated meat but I am awaiting to see how it really turns out.

Dr. Frank A. Lee
Cornell University
Geneva, New York.

It seems to me, at the present time, that radiation perhaps has considerable merit in certain forms of sterilization. I am a little dubious at the moment concerning "effective blanching" by this method because of the fact that the required dosage to inactivate enzymes is much too high to avoid other undesirable changes. This does not mean, however, that future research will not turn up other techniques which may alter the picture. At the moment, I have some research in mind which may turn up some interesting facts concerning perhaps the deleterious effects of radiation on certain components of food products.

Dr. E. A. Fieger,
Louisiana State University,
Baton Rouge, Louisiana

I attended the meeting of the section on Radiation of Foods at the I.F.T. meeting and I am more firmly convinced of the following: At the present time only a very few foods can be radiated without change in flavor. It will require years of research to develop techniques for irradiating foods so that flavor changes will not occur. For many foods this will probably never be realized. Irradiated food will have to be tested for possible toxic compounds. This I understand is being undertaken at present. Pasteurization irradiation shows some promise, but the foods so treated will require refrigeration. Industrial use is still several years away.

Institute Announces Plans to Test and Rate Air Conditioning Equipment

AN EXPANDED program which includes rating and testing air-conditioning and refrigerating equipment and formulation of policies which will give meaning and authority to "ARI Ratings" is being adopted by the Air-Conditioning and Refrigeration Institute, to the end that the public and trade may have authoritative guidance as to performance capabilities when they consider installation of such equipment.

The program was announced by Geo. S. Jones, Jr., managing director of ARI, following discussions at recent meetings of a number of the Institute's Product-Sections.

Rating and testing of room air-conditioners according to ARI Standards was announced by the Room Air-Conditioner Section of the Institute in September as the first step in the program. Already many of the 22 manufacturers of these units who entered into the program have included the ARI-rated capacity of their 1957 models in literature and advertising covering these models. Under the program, purchasers of room units will be able to make comparisons of cooling capacities of various models on an established basis of "British thermal units" as rated under the ARI Standard. This step was taken to get away from previous ratings of units in "tons" and "horsepower", neither of which applies directly to cooling capacity.

Increased activity of the Institute in the area of testing, rating, and identification of ARI-rated equipment will embrace other types of air-conditioning equipment, commercial and industrial refrigeration, component parts of these units and installations.

Equipment to be Labeled

"In the very near future the public will be able to place complete dependence on the ratings of products which have been tested under standards developed by the Air-Conditioning and Refrigeration Institute," Mr. Jones said. A method of labeling equipment tested and rated by ARI Standards also will be developed and publicized to establish public confidence, he added.

Mr. Jones said that while a definite method for giving validity to tests and ratings had not been fully determined, two possible methods are under consideration. One would involve a process of self-certification under which the manufacturer would make a pact with ARI and certify ratings of his equipment after testing on approved test facilities set up at his own plant or on such facilities operated by a recognized industrial testing laboratory. The second would utilize a "pre-certification" program, in which the manufacturer would submit each new model in his line to a central testing agency for testing and rating before marketing it.

The latter possibility is similar to the program of the American Gas Association, under which gas-operated appliances are tested and given the A.G.A. Seal of Approval. If this plan is adopted, the testing might be done either by a private laboratory or, possibly, by a laboratory established by ARI, if this were found feasible.

The Apple Scald Problem

DESPITE the years of research on the problem of apple scald, it still remains a problem. Last year, reports R. M. Smock and G. D. Blanpied of Cornell University in Farm Research, June, 1956, it was disastrously severe. It varies from year to year and from orchard to orchard. No one knows why. Handling methods, oiled paper, oil sprays, box liners, air purification with activated carbon, ventilation are all means that have offered encouragement but the satisfactory answer remains unfound. Two chemical inhibitors (diphenylamine and Santoquin) have shown promise but are not approved by Food and Drug Administration. According to these men, future research will concentrate on such inhibitors. The answer may come sooner or later, but will come only if research continues.—TRRF Bulletin.

Refrigeration for Hospitals – Preservation of Perishables and Air Conditioning

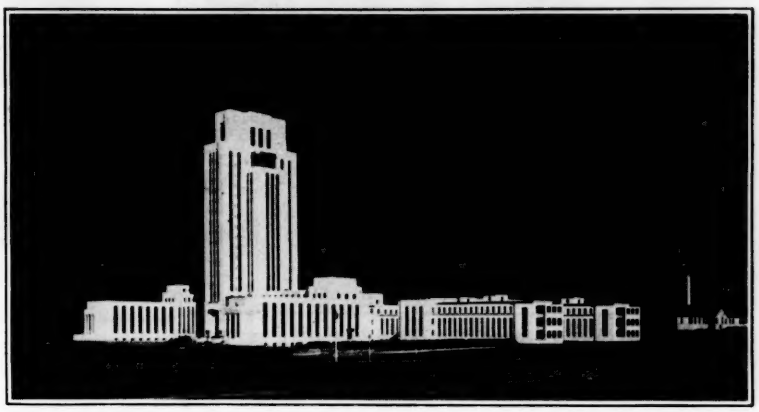
TERRY MITCHELL, M.E.
The Frick Company

TRADITIONALLY, refrigeration is necessary in the hospital for food preservation, freezing of food and ice, and cooling drinking water. Today and in the future refrigeration will play an increasing part in therapeutics (as well as in comfort) in connection with air conditioning for various purposes. In planning the modern hospital the provisions for refrigeration and air conditioning should be considered at an early date. A brief review of some of the most pertinent factors is offered.

A large hospital may have as many as 30 walk-in refrigerators and cold boxes for food service. These will be proportioned and equipped for holding the following products between the temperatures (F.) indicated.

Fresh meats	32-34	Fresh fruits	38-40
Frozen meats	0-5	Dried fruits	34-40
Frozen concentrates	0-5	Vegetables	36-40
Salt meats	36-40	Bakers' box	34-38
Fish	24-26	Cereals	35-40
Dairy products	36-40	Diet Kitchens	36-40
Cheese	34-40	Frozen desserts	10-15
Butter and eggs	28-32	Garde manger	36-38

Reprinted, with revisions, from The Architectural Record — Courtesy Frick Company



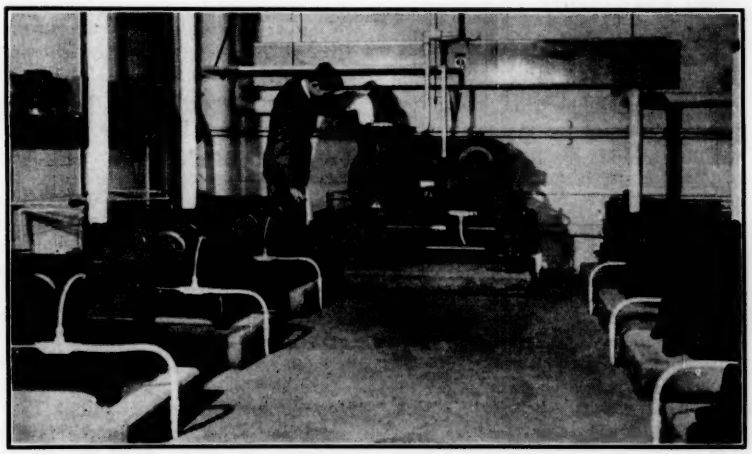
The Naval Medical Center near Washington uses refrigeration equipment for air conditioning, cooling drinking water, making ice, and holding a dozen boxes and rooms at specified temperatures.

Either wall-and-ceiling coils or fan-type unitcoolers are satisfactory for these spaces, if ample surface is provided to avoid drying-out of the foods.

Low Temperature Service

Low-temperature service in hospitals includes the usual freezing of ice cream and other desserts, the freezing and storage of quick-frozen foods, and the freezing and storage of blood plasma. Ice cream freezers are usually arranged to operate with direct-expansion ammonia under automatic control, or with cold brine as the refrigerant. A temperature of 5 to 8 F is required. The hardening room should be held at 0 or lower. Quick-freezers preferably operate at 20 to 50 F below zero.

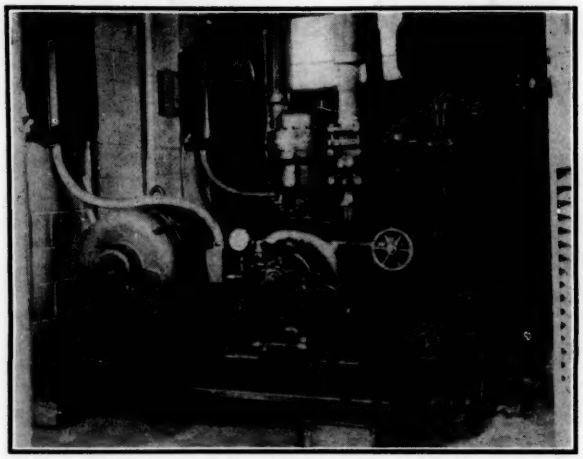
Ice is both indispensable to food service and essential in nursing practice. Some hospitals install ice-making systems of surprisingly large capacity. An average 250- or 300-bed hospital makes 1½ to 2 tons of ice daily. Clear ice, obtained by means of air agitation, is of course most desirable. The ice storage room, kept at 27 or 28 F need not be large enough to hold the entire output: ice not immediately needed is left in the cans, which vary in size from 50 to 100 or even 300 lb. The freezing times for these cans, with 16 F brine, are 11, 28 and 53 hours, respectively (using cans of 5 by 12 in., 8 by 12., and 11 by 22 in. section.) Or, ice may be made in the form of fragments, cubes, flakes, or compressed snow.



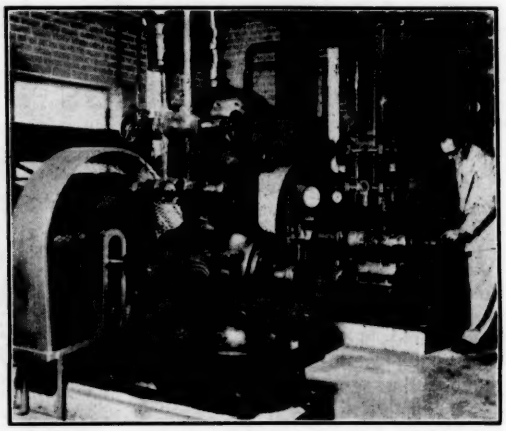
The Fourth Mental Hospital of the State of New Jersey, at Ancora, has 26 units on various refrigeration services.

Drinking Water Supplied From Central System

Cold drinking water is most economically supplied from a central system. A small pump keeps the water, chilled to 40 or 45 F, circulating past the fountains and pitcher outlets. From 1 to 1½ quarts per patient per hour should be provided: this takes care of the amounts used by the staff and visitors, waste, etc. As chilling tends to settle out any sediment in the water, the cooler should be of a type easily cleaned. Individual cooling units offer another solution of the drinking water problem. Morgue refrigerators customarily hold from 4 to 12 trays and are maintained at 40 F.



These compressors air condition eight operating rooms at the Altoona Hospital, where low-pressure refrigerating units also serve all cold storages and make ice.



Two new ammonia compressors at the Richmond (Indiana) State Hospital.

Air Conditioning

The initial equipment and installation cost of a central air conditioning system (from $150 per bed in wards, to $600 for a private room) has kept air conditioning from being installed throughout entire hospital buildings, except in a few instances. Cost of operating the air conditioning may run about 80 cents to $1.15 per bed per day. However, its value in certain departments has proved to be far greater than its cost. Window and floor type units offer other solutions of the problem.

Most remarkable results have been shown by controlling the air in nurseries for premature infants. Excluding hopeless cases and those dying within 48 hours, mortality was greatly reduced by holding the relative humidity close to 65 percent, and the temperature at 77 F. Maximum gain in weight and health were also noted at high humidities. Unusually weak infants are put in electrically heated incubators in the conditioned nursery, where they breathe cooled, moist air. Modern practice calls for babies to be "cribbed" in an air conditioned room. A high ventilation rate is advisable, provided no drafts are created.

Operating Rooms

In operating rooms high temperatures and humidities are favorable to the patient and are desirable in minimizing the static electricity which occasionally causes explosion of anaesthetics mixed with air. Conditions of 75 F dry bulb and 60 percent r.h., or up to 85 F dry bulb and 50 percent r.h., in hot climates, have been adopted as a compromise, to permit the surgeon and his staff to work efficiently. To avoid electric sparks, the operating table, apparatus, rubber sheeting, peoples' shoes and the floor are also preferably grounded. The humidity should be frequently checked.

All-fresh air is supplied to the room in sufficient quantities to give from 8 to 15 complete changes per hour, or is mixed in unusually large proportions with some recirculated air. This is necessary to carry downward the anaesthetic fumes, to overcome the heat from sunlight, lamps, sterilizers and personnel, and to prepare for emergency operations quickly. Yet no drafts should be felt. Careful filtering and perhaps sterilization of the incoming air with ultra-violet lamps, will aid in reducing infections. Double windows, the insulation of sterilizers, and forced ventilation of adjoining sterilizing rooms should also be considered.

Small Ward Cooled

Where possible, a small ward nearby should be air conditioned to protect patients from the prostration which often follows an operation. Some authorities say a low relative humidity (25 to 35 percent) is advisable for recovery rooms. Others believe recovery rooms and wards should be at the same temperature and humidity as the operating room. While no recirculation of the air is permissible in operating rooms, it is allowable in wards or private rooms, provided the air does not mix with that from other rooms. The spread of infections, odors, and noises to other parts of the hospital is thus prevented.

Oxygen rooms require average cooling to 72 F, with 35 percent r.h., to relieve strain on the heart of the patient. Oxygen therapy is least effective in the high temperatures and humidities encountered in an uncooled tent. Tents cooled with ice melt an average of 10 lb. per hour. Little if any fresh air need be admitted to an oxygen room: the walls are sealed and trap doors or curtains are used to maintain the high oxygen content (50 percent).

Wards for hay fever, asthma and similarly allergic patients are cooled to 76 F and 30 percent r.h. These conditions, combined with the most careful filtering of the air that can be afforded, prevent irritation of eyes and membranes, stop discharges, and reduce nervousness and inability to sleep. While not all cases are cured by air conditioning, from one half to three-fourths of the patients are given relief. It is especially appreciated by serious asthma cases, and by those who have not been desensitized successfully by injections.

Air practically saturated with moisture and heated to 106 or 107 F is proposed for hospital procedure in creating high artificial fevers. Present practice sometimes employs fairly dry air at 130 to 150 F with the possible danger of skin-drying and burns.

Storage of Biologicals

Vaccines and serums are preferably stored in small refrigerators in the pharmacy, and in others near the points of use. The temperatures usually wanted vary from 24 to 40 F, and must be unfailingly maintained. Penicillin has to be kept at 50 F (10 C.) or lower; either moisture or warmth will kill its effectiveness. Temperatures as low as minus 75 F are being used, in conjunction with vacuums down to 1/30,000 of an atmosphere, for freezing the moisture from penicillin during manu-

facture. The moisture sublimes from the drug while in the frozen state.

Blood plasma is similarly dried under a vacuum while frozen; less than one percent of moisture remains when the temperature in the vapor condenser is kept at minus 22 F. Or, plasma can be simply frozen in cabinets held at minus 6 F, and be stored at minus 4 F. Freezing takes six hours. Dr. Strumia of the Bryn Mawr Hospital writes that almost every hospital should be equipped to freeze and store plasma. A few larger hospitals could dry the plasma from the frozen state. Insulin and many other pharmaceuticals are also prepared and kept with the aid of refrigeration. These biologicals, as is well known, have opened a new era in medicine.

Ammonia Systems Isolated

Ammonia systems installed in the future generally must be in isolated engine rooms, with cold brine or cold water lines extending to the boxes and air conditioners. The ice tank is often in the machine room or other isolated space. Such systems, properly designed and installed and given ordinary attention, have proved dependable and economical. Low-pressure refrigerants are considered safer, provided they are installed where the gas cannot come in contact with a flame or spark, and these systems are generally less expensive, especially for small loads. Full-automatic controls are now available for operating either ammonia or Freon equipment. Whatever refrigerant is employed must meet local safety regulations in its application. Safety Code B-9 of the American Standards Association lays down practical rules for safeguarding refrigeration installations.

Consider the use of evaporative condensers, as a saving in cooling water. A purger for removing air and non-condensable gases, practically without loss of refrigerant, should be a part of large and medium-sized systems.

In arranging the air conditioning system, the dry-bulb temperature and the relative humidity should be independently controlled both in summer and winter. Quiet-operating equipment should be selected. Explosion-proof motors and controls are necessary in the operating and delivery rooms. Pneumatic controls eliminate any danger from electric arcs. Insulation and sound-proofing are desirable in the conditioned area, especially at the ceilings.

Windows in air conditioned hospitals are often either double-sashed, weather-stripped, or closed tightly and caulked. Inside doors, leading to such places as the attic, basement, and elevators, should be treated the same as windows, to prevent the leakage of air to unconditioned spaces and to maintain the desired internal pressure. Awnings and venetian blinds outside help to keep out heat in summer.

The layout will probably include a central system furnishing fresh air and ventilation to the various rooms. This supply is filtered and then dehumidified sufficiently to maintain the dew point wanted in the major areas. Additional treatment in separate conditioners dries the air further, as required in the oxygen room and allergic wards. To obtain low relative humidities, the water might have to be cooled to 35 F, and part of the air to 40 F. The air leaving each room can be exhausted either through regulators in the windows, or in the doors leading to the halls; sometimes through both.

Exhaust fans are recommended for the kitchen, bathrooms, sterilizing rooms, etc. Care should be taken that this system does not exhaust conditioned air from the treated spaces except as required to produce equalized pressure on both sides of the entrance doors. The building committee, surgeons, head nurse, dietitian, and operating engineer will all have preferences regarding details of the work. Various considerations and limitations will often make compromises necessary.

Pacific Fruit Express Company Starts Centrifugal Ice Plant Construction

CONSTRUCTION started in mid-September 1956 on the new Pacific Fruit Express Company 700-ton railroad car ice manufacturing plant at Ogden, Utah. Although plant construction has been announced previously, it wasn't until the NAPRE Convention at Detroit, October 29 through November 2, that details of the new plant were learned.

PFE's mechanical engineer, Robert F. McKee, and superintendent of refrigeration, LeRoy Etzel, disclosed certain departure from standard practice in construction of this new facility. Principal deviation appeared in the use of centrifugal compressors for producing the 700 tons of refrigeration. Insofar as it could be learned at this time, there was only one other industrial ice manufacturing plant in the United States that employs such a compression system. That plant is a much smaller installation than the PFE Ogden unit.

There will be four independent refrigeration systems in the new plant, serving four ice freezing tanks. Each will have a maximum capacity of 285 tons. Sodium chloride brine will be used as the refrigerating media in the ice tanks.

Refrigerant-12 System

Brine from the ice freezing tanks will be circulated through a conventional centrifugal-condenser-chiller unit. However, a second departure from standard practice for industrial ice making is the fact that the refrigerant is not ammonia. It will be refrigerant-12. The new plant, 96 x 240 feet will employ radiant heat in the floors except under the ice making field. In this area the sub-floor will be provided with a drain grid, and means of providing ground heat will be installed at adequate depths to prevent ice formation under the tanks as there will be no insulation beneath them.

Lack of insulation beneath the ice manufacturing tanks will be considered a departure from normal practice by many, but a fourth and rather revolutionary innovation will be the lack of covers for the ice tanks. The four ice tanks will resemble four very large horizontal shallow frozen food cabinets such as found without covers in the modern supermarket. PFE engineers believe that a still air blanket held over the rows of ice cans by the raised tank perimeters will effectively cut-off any detrimental heat transfer from the tanks to the surrounding atmosphere. Use of these features and the centrifugal refrigeration system is anticipated to bring the total installation cost to approximately 75 percent of the conventional reciprocating ammonia plant with heavily insulated, covered, ice manufacturing tanks.

New Refrigerated Warehouse

THE MERCHANTS Company of Mississippi plans to construct a $100,000 modern refrigerated warehouse in Vicksburg, Miss. to house its meat and packing house products operations. W. W. Wright of Jackson, president of the company, says the plant will be constructed of concrete, steel and brick and fully insulated with four to eight inches of corkboard. It is one of five such facilities operated by the company. The other plants are located in Hattiesburg, Jackson, Gulfport and Bogalusa, Louisiana.

Maryland Creamery Uses Direct Expansion System for Cooling Milk

ONE of the successful creameries in the State of Maryland is operated by The Koontz Creamery Inc. The main plant is at 5600 Reisterstown Road, in Northwest Baltimore. A dairy product manufacturing and milk receiving plant is at 111 John Street, Westminster. G. A. Oursler is president of the firm.

The Creamery operates a fleet of over 150 milk delivery trucks, plus 40 refrigerated trucks used for supplying wholesale milk and dairy products to stores and institutions. A large, well-equipped service garage adjoins the parking lot for trucks, behind the plant in Baltimore.

The refrigerated trucks are equipped with eutectic plates and insulated bodies. They are cooled at night by direct-expansion ammonia, fed through detachable hose lines. The ammonia liquid supply and suction lines extend around three sides of an enclosed truck yard; both these lines are insulated, and are protected from the weather. Pipe lines and rubber hoses can be clearly seen at the right in the truck parking lot picture.

Ammonia is Precooled

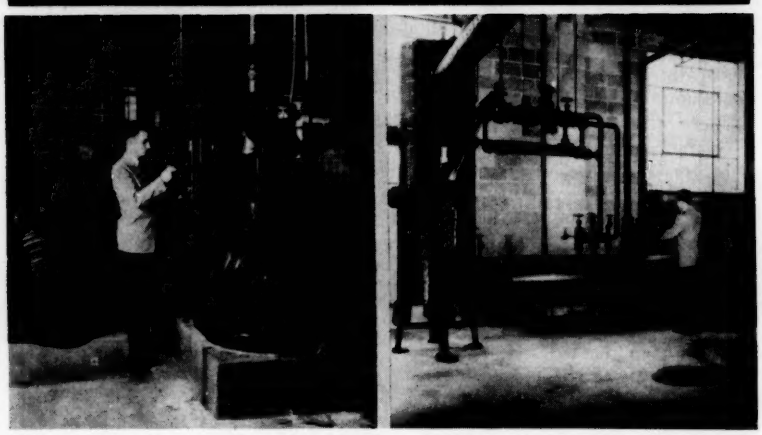
When liquid ammonia is expanded into a cooling coil there is normally a loss of about 10 percent in efficiency because the ammonia must first cool itself. To overcome this, the liquid ammonia at this plant is precooled, being fed through a long coil in the accumulator, where the cold suction gas is trapped on its way back to the compressor.

The compressor (shown in another picture) has two cylinders, 8 × 8 in. and is operated at 400 rpm by a 75-hp. Howell motor. The machine is equipped with automatic capacity controls so as to balance the load, and also has an oil pressure safety switch. High-and low-pressure cutouts are provided for further safety.

The condenser is the evaporative type, and is galvanized throughout. It is mounted on the roof of the engine room, which adjoins the garage. The accumulator (shown at the left in the third picture) is 2 ft. in diameter and 8 ft. high, carefully insulated. In winter a smaller ammonia compressor with bore and stroke of only 5 in. is sufficient to carry the load.

This direct-expansion method of cooling trucks with a central refrigerating system is said to be the most efficient known. The trucks are plugged-in to the liquid and suction lines when returning from their routes. The refrigerant feed to each truck is regulated by a thermal expansion valve with a strainer and bulb, which controls the temperature within the limits desired. At the Koontz Creamery it is customary practice in summer to chill the plates in the truck bodies to a temperature of 18 F.

A similar truck system is in operation in Baltimore at the packing plant where Esskay meat products are prepared. Both systems were designed and furnished by Frick Company of Waynesboro, Penna.



Views of Koontz Creamery in Northwest Baltimore, Md. Above, a corner of the parking lot where trucks are cooled overnight. Left, Frick VSA twin Cylinder 8x8 inch compressor used for NH_3 truck cooling system. Note operating instructions posted on wall at right of compressor. Right, Intercooler which serves dual function of trapping and boiling off any NH_3 vapor entrained in suction lines from truck parking lot and precools the liquid NH_3 before it is fed to the truck lot. Receiver and liquid piping are at right of intercooler.

Fact Finding Conference

BLUEPRINT for Progress" is the theme around which the Institute of American Poultry Industries will build its 1957 Fact Finding Conference, reported Dr. Cliff D. Carpenter, Institute president. This 28th annual meeting will be held in the Municipal Auditorium, Kansas City, Mo., February 15, 16 and 17.

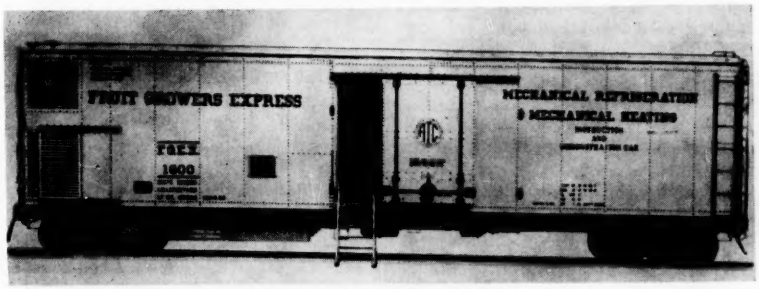
During the three-day meeting there will be five program sessions: Outlook Workshop, Refrigeration Workshop, Research and New Idea Workshop, Marketing-Merchandising Workshop, and Management Workshop. The exhibition hall will contain exhibits occupying over 50,000 square feet devoted to the modern tools necessary in today's poultry and egg production, procurement, processing and merchandising operations. The exhibit feature of the conference has grown continually since the first one in 1946. At that time, nine companies exhibited their products. At press time, it was reported that the 1957 exhibit will again exceed the previous year which reached a record 127 exhibitors.

Another feature of the conference will be the fourth annual Junior Fact Finding Conference for 4H and FFA boys and girls. Two groups cooperating with the Institute in this event are the National Committee on Boys and Girls Club Work, Inc., and the Federal Extension Service. By November 1, 21 states already had indicated participation.

Demonstrator Refrigerator Car Provides Training for Service Men

OUTFITTED specifically for training purposes, FGEX 1600, a new 70-ton capacity, full-envelope mechanical refrigerator car, was displayed at Detroit's Union Station, October 31 through November 2, 1956 as an NAPRE educational exhibit. The interior of this car has been equipped into a veritable "Classroom on Wheels" for lectures and visual aid training, with all important machinery parts available for observation under simulated working conditions. Primary mission of this unit is to aid in the instruction of the employees of Fruit Growers Express Company and its associated Companies, Western Fruit Express and Burlington Refrigerator Express, in the servicing and repair of mechanical refrigerator cars on the contract railroads of these Companies. The NAPRE visit was arranged by J. C. Rill, President, FGE.

While on display at the Detroit NAPRE Convention, the car was accompanied by Carl Booker, who conducts classes for employees in the car over the Fruit Growers Express — Western Fruit Express — Burlington Refrigerator Express network of service and repair stations. C. J. Jamison, FGE Northwestern Division Manager was present for the NAPRE breakfast session, Wednesday, October 31, at which detailed announcement of tour arrangements for the three-day visit was given to the delegates. Bruce Duff, Mechanical Maintenance Supervisor, FGE, participated in the NAPRE Refrigerated Transportation Panel discussions on Thursday, November 1.

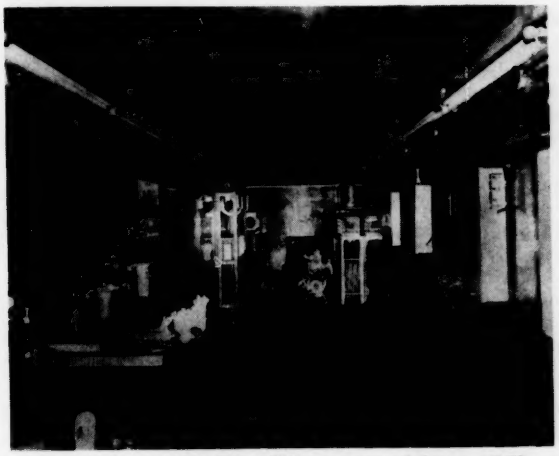


Special educational exhibit at NAPRE's 47th Annual Convention was FGEX 1600 — Instruction and Demonstration Car — a new 50-ft., 70-ton mechanical refrigerator car which has been equipped for "on-the-job" training of BRE-FGE-WFE employees.

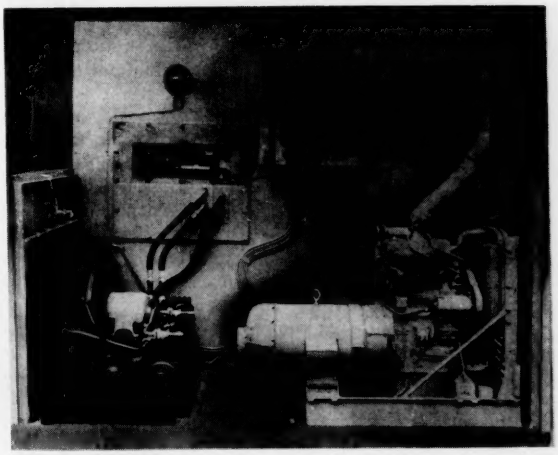
Pioneers in the development of mechanically equipped refrigerator cars to present-day acceptance by shippers and consumers of frozen foods as the most dependable and versatile vehicle for handling their products, FGE-WFE-BRE developed and uses the new instruction and demonstration car to insure that their huge investment will be protected and that these 1,000 cars will be ready at all times to provide the dependable protective service for which they were designed and are capable. The Fruit Growers Express is reported as having already invested many millions of dollars in a pooled fleet of 1,000 such mechanical refrigerator cars and has an additional 280 on order.

Car Interior Truly A Rolling Class Room

With fluorescent and auxiliary lighting, folding chairs for "students", work-bench, and working tools, NAPRE delegates and convention guests receiving instruction had the following equipment for study at first hand as a supplement to lecture material: 2-cylinder, 2-cycle Diesel engine (cutaway); condensing unit, with cutaway compressor; evaporator, blower, and refrigeration



Interior view of FGEX 1600, converted into a "Classroom on Wheels", with all important machinery parts available for observation under simulated working conditions. This unit was inspected by NAPRE delegates and guests at the Detroit convention in November.



View of typical machinery compartment in a modern 50-ft., 70-ton Frigidaire equipped all-purpose mechanical refrigerator cars constructed by Fruit Growers Express Co. in 1956, showing (at left) Condensing Unit on Floor, Refrigeration Panel, and Defrost Switch; (at right) Diesel Alternator on Floor and Electric Panel.

panels; complete set of refrigeration equipment; motorized Diesel engine fuel system with pressure gauges; Viso-trainer (transparent) refrigeration system with charts, projector, and screen; all electrical panels (DRC) provided with indicator lights to show operation sequence; cutaways of electrical and refrigerant controls; operating parts.

To Continue Touring Nation

The instruction and demonstration car has already covered many of the principal FGE-WFE-BRE service stations and shops, and will continue in such service until each employee concerned with the handling of mechanical refrigerator cars has had an opportunity to learn all about the servicing and maintenance of these cars. FGE-WFE-BRE contract with 70 railroads operating in 40 States and the District of Columbia for the railroads' refrigerator car and protective service requirements. Tneir mechanically equipped refrigerator cars are available on all contract lines.

Their first mechanical refrigerator car in general commercial service received its initial load on February 25, 1949. To the present date, the mechanical refrigerator cars operated by these Companies have successfully handled more than 33,600 carloads of perishable commodities and have traveled more than 62 million car miles under load!

With some eight years of experience in building and operating mechanical refrigerator cars and with shops, shop equipment, and instruction schedules coordinated with a trained coast-to-coast service organization, the success and continued progress of this fast growing railroad freight operation is assured.

Chemical Changes in Fish Actomyosin During Freezing and Storage

CUSTOMER preference for fresh rather than frozen fish is well recognized and the reasons for this preference have been the basis of study, as reported by Harry L. Seagram, Fishery Products Laboratory, U.S. Fish and Wildlife Service.

The important changes in fishery products that have been associated with freezers and cold storage as reported by Mr. Seagram, are loss of tenderness and characteristic fresh-fish flavor. There is a subsequent development of texture changes, variously described as toughness, stringiness, mushiness, etc, and of off-flavors and off-odors. Deevlopment of off-flavors and odors is usually attributed to fat oxidation, even in lean fish. Loss of characteristic fresh-fish texture has been related to what is termed protein denaturation or, more simply, alteration.

Protein Denaturation

Protein denaturation may be caused by many agents or conditions and, in effect, may result in a product of quite variable quality. Since relatively little is known concerning the true nature or structure of proteins, denaturation and its over-all effect on the quality of a food product is also incompletely understood at the present time.

This paper reports a study of changes in properties of the actomyosin fraction of fish muscle that has been subjected to frozen storage. The properties of chemical activity, asymmetry, and solubility of the protein were investigated. An attempt has been made to gain a better understanding of the basic nature of the adverse effects of freezing and cold storage on the quality of fish protein.

Conclusions

The conclusions from this study are that: (1) The freezing process itself produces some subtle change in the structure of actomyosin present in post-rigor fish muscle, yielding a more symmetrical molecule. A significant change in structural configuration was not indicated by the very slight increase in reactive — SH groups, however. Continued frozen storage is responsible for some yet unknown change which causes progressive and irreversible aggregation of the actomyosin, althouh no indication of a "preliminary step" or trend prior to aggregation was detected. (3) When actomyosin "freeze-denatures" or aggregates, changes in structural configuration probably occur. It would apepar that the salt-insoluable or aggregated fraction is that which is most closely related to texture changes associated with cold storage fish. Due to the nature of the aggregated protein, attempts to study this fraction have thus far met with little success.

Storage Tests

Practical storage tests definitely indicate a variable cold storage life for different species of fish which is related to the degree of actomyosin aggregation. W. J. Dyer states that a comparison of the cold storage ability of different species suggests a relationship to lipid content. Recent unpublished work at this laboratory would support this finding, suggesting a possible correlation between cold storage stability and the lipid complexed with the actomyosin of various species of fish.

When actomyosin was frozen and thawed, that fraction still soluble in dilute salt solution showed only a very slight increase in reactive -SH groups (from 52.4 to 55.6, as percentage of the total -SH groups). That fraction which aggregated, or lost its salt solution-solubility, showed a larger but variable increase (from 52.4 to 55-66 percent). Total -SH groups remained constant on freezing (0.76 g. cysteine per 100 g. protein).

On freezing actomyosin, an immediate decrease of the intrinsic viscosity was noted (1.70 to 1.17). On prolonged frozen storage (−30 C. for 300 days), no further significant change in the intrinsic viscosity was observed.

Actomyosin solubility showed an increasing trend toward a maximum solubility after about one month's storage and then declined quite continuously beyond that point.

Refrigeration in Australia

A SIX-PAGE refrigeration centenary supplement was issued by the Sydney Morning Herald, September 7, reviewing historical data and industrial uses of refrigeration in Australia.

The review started with September 23, 1856 when a patent was issued for a refrigerating process to James Harrison, Mr. Harrison for a time worked as a printer for the Sydney Herald and while there observed that a mixture of sulphuric ether and ammonia, which printers used to clean type, made metal very cold. He experimented with this as a refrigerating medium and in 1850 operated the first refrigerating compressor to demonstrate artificial ice making and in 1851 installed one of his refrigerating machines in a brewery at Bendigo.

Mr. Harrison, prospered but in 1873 lost his fortune when an experimental shipment of frozen meat to London spoiled because of a breakdown in refrigerating machinery during the voyage. Meanwhile Thomas Sutcliffe Mort, a Sydney businessman, and Eugene Nicolle, a French engineer, had in 1861 established the world's first freezing works at Darling Harbour, Sydney. In 1880 Mort successfully exported 400 carcasses of frozen meat to Britain in the S.S. Strathleven.

Mobile Reefer Carries Refrigerated Meat From Packer to Retail Store

Fork lift truck transfers mobile reefer from truck to railroad car

A NEW method of transporting perishable meats under refrigeration from the packing plant to retail outlets in major cities is being tested during a 90-day experiment launched jointly by Geo. A. Hormel & Co., North American Car Corporation and the Clark Equipment Company. Main feature of the new delivery system is the fact that meat may be prepacked for a specific delivery route at the packing plant and held in the original refrigerated units at a constant temperature until delivery at the retail store, according to H. H. Corey, Hormel's Board Chairman.

The idea of continuous refrigeration in transit from packer to retailer was first conceived by Jay Hormel, late chairman of the board, a pioneer in developing new products and services. North American Car Corporation undertook a research and development program based on the Hormel idea and culminating in the present refrigeration experiment. Name of North American's new rail car development is "Mobile Reefer."

The Mobile Reefer is of steel construction with overall length of 138 inches, overall width of 96 inches, overall height 92⅝ inches, with content of 475 cubic feet, and 10,000 to 12,000 pounds capacity. It is equipped with a 200 pound Foster built Super Coldshot Dry Ice bunker with circulating fan. Four inches of Fiberglas insulation are used throughout the body.

Full height doors are located in the end and one side of each box to help speed the loading and unloading of contents. There are no thermostat controls but proper temperatures are obtained by varying the amount of Dry Ice used.

The operation requires a specially adapted railroad car, holding four mobile reefers, and utilizes a locking device developed by Clark Equipment Company for their Mobilvan system. This lock makes it possible for the refrigeration units to be lifted onto the railroad car and locked in place, or unlocked and unloaded, by one man operating a fork lift truck. Close scheduling of shipments is made possible by the speed and simplicity of the loading and unloading operations. The switch engine can bring the car to the unloading area, wait only a few minutes while the full units are taken off and empties put on for the return trip to the packing house.

Each of the four Mobile Reefers is transferred from the railroad car to a waiting truck, also equipped with the locking mechanism, and delivered to a retail route. The refrigerated units are not opened from the time they leave the packing plant until the time they arrive at the retail stores.

Advantages of Mobile System

"Mobile Reefer has several distinct advantages over the piggy-back system," Corey said. "Where 'piggy-back' requires three men for loading and unloading, mobile reefer is automatic, requiring only a lift truck. Where 'piggy-back' has to be loaded and unloaded from the end of the railroad car, our units can be handled from the side of the car, at either ground or platform level, regardless of their position on the car. Another advantage of the mobile reefer system is that it eliminates the shipping of heavy axles and wheels on the car, as in the 'piggy-back' system."

Special Equipment

The railroad car specially adapted for the mobile reefer system includes the following equipment:

Generator and electrical system. The generator works off the wheel when the car is in motion, providing power to turn the fans for circulation inside the refrigeration units. (Refrigeration itself is provided by dry ice.) Also, there is a receptacle for standby power to operate the fans when the car is standing.

Spacers between the refrigeration units provide for positioning and added safety.

Mobillock latching mechanism and Mobilplank anchor mechanism developed by Clark Equipment Co. The latching device is in the chassis of the mobile reefer. This engages the anchor mechanism on the deck of the car. The lock is actuated by the fork lift; when the forks are inserted it unlocks; when the forks are withdrawn it locks. Reelites are used to automatically retract wiring when the units are unplugged and ready for unloading.

The 90-day experiment is being run on the Milwaukee Railroad between Hormel's Austin, Minn., plant and Chicago. First delivery of meat from the Austin plant, consisting of 40,000 pounds, arrived in Chicago on Thursday, September 6. During the period of the experiment, three shipments a week were being made, arriving in Chicago on Mondays, Wednesdays and Thursdays.

"This system promises many advantages in the distribution of perishable meats from the packing plants to retailers in major cities," Corey said. "In congested urban areas, the Mobile Reefer is the ideal way to deliver meat to our customers with speed, efficiency and even better quality control."

Nuclear Reactor Research

TEN major organizations of this country in different industries announced the formation of Industrial Reactor Laboratories, Inc., at Plainsboro, N.J., to build and operate a privately-owned reactor. Continental Can Co. said it hopes to gain additional practical knowledge about the effects of radiation sterilization on foods themselves and on materials that are used to package them, or may be used in the future. Continental terms its objectives long range and doesn't expect any commercial application of the results for an indefinite period. Continental Can Co. is one of the members of this group. — TRRF Bulletin.

Engineers Discuss Sub-Zero Temperatures at Cryogenic Conference

MORE than 400 scientists and engineers attended the 1956 Cryogenic Engineering Conference held September 5-7 at the Boulder (Colo.) Laboratories of the National Bureau of Standards. The second meeting of this kind to be held in the United States, the conference dealt with problems of engineering research and development at temperatures below 150 K (190 F). In this temperature range the behavior of materials is markedly different from that observed at ordinary temperatures.

Liquid-Hydrogen And Liquid-Helium

Considerable interest was shown in the group of papers dealing with liquid-hydrogen and liquid-helium bubble chambers for detecting and observing the behavior of high-energy particles. The 10-inch bubble chamber now operating at the University of California Radiation Laboratory was described by R. L. Blumberg, J. D. Gow, and A. J. Schwemin of the Radiation Laboratory. In this apparatus high-energy particles are passed through the superheated liquid at speeds approximately that of light. From a high-speed photographic record of the tracks of the resulting bubbles, studies are made of the interaction of the atomic particles. The bubble chamber fits into a magnet capable of providing a 12,000-gauss magnetic field, which deflects charged particles traversing the chamber so that particle momentum may be determined.

A larger bubble chamber is now being designed at the University of California Radiation Laboratory with the assistance of the National Bureau of Standards. This apparatus was described by D. B. Chelton and D. B. Mann of NBS, and R. A. Byrns of the Radiation Laboratory. The larger chamber will allow more extensive observations to be made of atomic particle interactions. It will contain approximately 500 liters of liquid hydrogen, will have a 23 by 75-inch glass window weighing several hundred pounds, and will be maintained at the desired operating condition by a closed-cycle hydrogen refrigerator of approximately 2000 watts.

R. H. Kropschot and R. P. Mikesell of NBS reported on their experiments with glass at low temperatures. These investigators measured the strength and fatigue properties of BSC-2 optical glass at various temperatures within the range from 20 to 296 K. Their data will be of value in constructing the window of optical glass needed for the large bubble chamber.

An ultra-powerful magnet constructed at Los Alamos Scientific Laboratory was discussed by Dr. H. L. Laquer of the University of California. Ultimately it is hoped that this magnet can be used to cool matter to temperatures lower than any previously attained. The magnet differs from most electromagnets in that it requires only 1/100 of the electric power needed to operate a room temperature magnet of equal size. When cooled to liquid hydrogen temperatures, the magnet coils become excellent electrical conductors.

A new practical application for liquid hydrogen was described by M. D. Andonian of the Cambridge Corporation, who told how engineers doing work for the Air Force Cambridge Research Center have found a way to replenish gas lost from a high-altitude weather ballon while it is still in flight. A specialized storage container has been developed that holds nearly 120 gallons of liquid hydrogen and can be attached to the balloon for automatic refueling. With this device, weather balloons will now be able to remain aloft many hours longer, making more extensive observations than ever before.

Low Cost Method

A potentially low-cost method for obtaining heavy hydrogen by low-temperature distillation of liquid hydrogen was discussed in a paper by T. M. Flynn, D. H. Weitzel, K. D. Timmerhaus, P. C. Vander Arend, and J. W. Draper of NBS. With the advent of electrical energy from nuclear power, a considerably increased demand for heavy water can be expected, and its cost will be a significant factor. The heavy hydrogen obtained by the distillation process can then be used in making heavy water. The NBS cryogenic engineering Laboratory is now constructing a pilot plant to evaluate the process on a larger scale.

G. F. Tanza of Garret Corporation reported on a ball bearing that will operate without any lubrication at temperatures very close to absolute zero and at speeds as great at 10,000 rpm. The ball bearing is of stainless steel and utilizes a plastic retainer. It will operate continuously for at least 150 hours at temperatures ranging from −420 to +100 F.

Gas Refrigeration Machines

An invited paper on gas refrigeration machines was given by Dr. J. W. L. Kohler of the Philips Research Laboratories, Eindhover, Netherlands. He described an unusually compact, single-cylinder water-cooled apparatus for gas liquefaction. This machine is unique in that the gas does not pass through the working parts, but condenses on the surface of the cylinder head. Thus, an exceptionally pure product is obtained, free from lubricating oil or similar contamination. Designed primarily for liquid air production, this apparatus can, with simple modification, be used for industrial gases. Production begins in as little as 15 minutes after starting the operation, whereas conventional methods require more than two hours before the processes begin.

Liquefying Experiments

Dr. S. C. Collins of the Massachusetts Institute of Technology described experiments he is conducting to liquefy helium and hydrogen at a cost only slightly greater than that of liquefying air. A heavy-duty machine that has been built at MIT for this purpose will run for years with only a nominal maintenance cost. This machine is now experimentally producing liquid helium for as little as $4.00 a quart. Conventional methods usually result in helium liquefaction costs of at least $25.00 a quart. Served by a three-stage 90-horsepower helium compressor, the apparatus has a capacity of about 45 liters of liquid helium per hour or about 50 liters of liquid hydrogen.

New Catalyst For Converting Liquid Hydrogen

Development of a new catalyst for converting ordinary liquid hydrogen to para-hydrogen was discussed in a paper by D. H. Weitzel, O. E. Park, J. W. Draper, and K. D. Timmerhaus of NBS. This new catalyst, an iron hydroxide gel, is nearly 50 times more effective than the catalysts previously used for this purpose. In the para form liquid hydrogen can be stored for long periods with greatly reduced loss. V. J. Johnson of NLS described a method for installing the new catalyst in the Bureau's large liquefiers to increase their rate of production as much as 18 percent.

Practical Refrigerating Engineer

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS

NAPRE Elects Officers, Expands Board, Accepts Industrial Members, Admits New Chapters at 47th Convention

CHIEF executive of NAPRE for the 1957 term is Bert C. McKenna. Elected president at the annual business meeting of NAPRE on November 1, McKenna will head up the new board of directors of NAPRE consisting of 13 members. This elective group, formerly numbering 12, establishes the Association policies and actively manages the Association affairs between annual meetings.

Other officers elected were Frank L. Chase, vice-president; Roy T. Burns, second vice-president; Leland M. Kenagy, treasurer; J. Richard Kelahan, secretary and Cecil M. Sullivan, sgt-at-arms. Chairman of NAPRE's board of directors is John N. Mariakis. The other directors are, in addition to the national officers, Hubert Branham, R. A. O'Neill, John M. Muller, M. E. Bell, Eugene Rytlewski and past president Leroy Etzel. Professor Harold P. Hayes continues as chairman of NAPRE's Educational Committee and Guy R. King as vice chairman. George H. Paulick continues as membership chairman. Charles M. Heemstra was appointed chairman of the Venemann Memorial Educational Loan Fund Committee.

Exhibit Tour Opens Meet

Opening in the Detroit Statler on Tuesday October 30, the convention featured speakers on service and maintenance topics, as well as on new developments in the industrial refrigerating and air conditioning fields. Speaker headliners on the program were reported on in the November issue of INDUSTRIAL REFRIGERATION, pages 36 through 38.

Preceding the meeting call to order, delegates, members and guests toured the exhibits arranged in the Bagley Room of the Statler. Exhibit chairman John Mariakis, assisted by local chairman Walter Arndt, introduced the exhibitors and their representatives to the delegates. As the opening time approached members were then admitted to the Wayne Room, scene of the business and educational meetings.

A large display of carved ice welcomed the NAPRE delegates at the entry to the Wayne Room. This welcome was arranged by Malcolm C. Cameron chief engineer, Detroit City Ice & Fuel Co., (a Div. of City Products). The carvings had yellow lights imbedded in the base which gave a golden touch to the entire display. Two punch bowls were provided by the same member on Thursday, also carved from ice.

Following the invocation, welcome and response, the ladies and gentlemen of the convention parted company. Daily, the ladies took trips through industrial and cultural sites in Detroit, while the gentlemen occupied themselves with business and educational sessions at the Statler. Each evening the men and women would come together again for a social event.

New Type Session Popular

Most popular business session Tuesday proved to be a newly introduced idea of a chapter clinic. For this session the chapter officers teamed up with the Association's educational vice chairman, to take on problems of an administrative or educational nature from the floor. Delegates came prepared with numerous questions and a number of problems which were presented to the panel appeared to be common to some of the smaller chapters.

Many of the chapter delegates themselves offered solutions to problems presented. The interest in this type of program was so intense that the president had to bring the sessions to a forced close late in the afternoon in order that the members could obtain supper and return for the evening tour and social. From the enthusiasm displayed it is evident that a chapter clinic will continue to be a feature of coming conventions.

On Tuesday evening the delegates were taken on a tour of the air conditioning facilities at the Statler hotel. Just completed was the latest addition covering some 900 rooms, installed by the Chrysler Air-temp Construction Corp. This firm was host to a party which followed the tours through the hotel. Engineer members were treated to an opportunity to witness, under one roof, three distinct evolutions in the application of reciprocating compressor equipment to air conditioning systems. The earliest equipment installed in this plant and still operating consists of several CO_2 compressors of the horizontal double-acting type. This refrigerant is used to cool some of the first air-conditioned public rooms in this hotel.

The next installation, which completed the public room applications and included a small number of guest rooms and suites, was a vertical double-acting type machine in a *Re-*

NAPRE Series on Operation and Maintenance Articles To be Resumed in January

WITH this issue, the series of articles on the Operation and Maintenance of certain equipment in the "Prevention of Refrigerating Plant Failures" is interrupted for a detailed account of the 47th Convention held last month in Detroit. The practical plant operating series will be resumed in the January issue of Industrial Refrigeration. Each monthly issue will again feature a derangement preventive article.

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OFFICERS
President: Bert C. McKenna
Chicago 12, Ill.
Secretary, J. R. Kelahan, Chicago 44.

Operating engineers of all refrigerating plants are invited to affiliate with the National Association of Practical Refrigerating Engineers, Inc., an educational association, "not-for-profit".

Views of the Bagley Room at the Detroit Statler during NAPRE's 47th Annual Convention. This room became the Association's exhibits hall, a popular spot with members and their ladies between convention sessions. Lower left is a view of the exhibit room opening ceremonies at which NAPRE's board chairman, John N. Mariakis, officiated. Mrs. Mariakis wields the scissors on the tape which sealed the room off prior to the opening ceremonies. L. to r., Mrs. William Appleton, of the Detroit Ladies' Committee; Mrs. and past president Leo J. Vivien; Charles C. Moore, Memphis; Mrs. Mariakis, Director Mariakis, and Bart Mancuso, past president, New Orleans Chapter.

frigerant-12 system. Many members had never seen a verical double-acting machine. The latest installation, completed this year (as reported in the June issue of INDUSTRIAL REFRIGERATION) was the 8-compressor, (ea. 7-cylinder), 4-unit Chrysler Air-Temp Corp. plant.

Breakfast Business Session

The kick-off feature for Wednesday was a breakfast session. At this affair, NAPRE honored seven new Industrial Members. Representatives of these firms accepted membership certificates when introduced by the national secretary. Then president LeRoy Etzel presented each with a membership certificate and expressed appreciation of the Association for the interest which each firm had shown in NAPRE and its educational objectives.

Following the presentation of Industrial Members, the breakfast session attendants witnessed the presentation of three membership trophies. Annually NAPRE presents trophies to those chapters who are outstanding in their membership efforts. A formula used by the membership committee, based on renewals of membership as well as new members, determines the winner. Larger chapters in the association compete on the basis of the number of points earned, the points being proportionate to the new member and

renewal effort. Smaller chapters compete on a percentage basis. Overall effort, based on both points and percentage determines the award of the Emerson A. Brandt trophy,

Early convention arrivals admire an ice carving welcome presented to them by Malcolm C. Cameron, Chief Engr. of Detroit City Ice & Fuel Co. Ladies admiring the art are (l. to r.) Mesdames LeRoy Etzel, Hubert Branham, John G. Muller, and Wm. Ray Burnett.

awarded annually by the NAPRE's board of directors.

Winner of the large chapter trophy was Louisiana Chapter No. 2 at New Orleans. The smaller chapter trophy went to Stockton-Modesto Chapter in California. Topping both of these chapters in performance was Michigan Chapter No. 1 at Detroit, winning the Brandt trophy.

Fruit Growers Express Exhibits Instruction & Demonstration Car

As previously reported, the educational sessions on Wednesday were recessed at noon in order that all delegates could participate in the tour of the new General Motors Technical Center at Warren, Michigan. An added attraction to the outside tours and inspections from Wednesday through Friday was the exhibition of the Fruit Growers Express Instruction & Demonstration Car at Fourth Street Union Station.

Arrangements had been made by the Association's educational committee with J. C. Rill, president, Fruit Growers Express Co. for the Instruction and Demonstration Car, as an educational feature of the 47th Convention. A report on the car, its equipment and activities is given elsewhere in this issue. Clark J. Jamison, Bruce Duff and Carl Hooker, FGE, were on hand to answer inquiries.

On Wednesday evening the delegates, their wives and guests were entertained at the St. Clair Yacht Club by Chicago Chapter, NAPRE, and the George B. Bright Company of Detroit. Designated as an exhibitors frolic and halloween party, this affair featured introductions once again of both Exhibitors and Industrial Members. At the conclusion of these introductions the members enjoyed themselves with a buffet and refreshments, followed by dancing.

Testimonial Presented Etzel

Climax of the convention activities was the Thursday evening meeting with the installation of new officers elected earlier that day. The installation takes place at the annual banquet. After instructing each officer in his duties and declaring them duly qualified to fulfill their positions, retiring President Etzel was in turn presented with a testimonial by the new president, Bert C. McKenna.

Following this presentation, the Detroit chapter secretary, Leon L. Adams, was honored by the local membership and the delegates present. Adams, who has been secretary of the chapter for better than three-fourth's of the chapter's life, was presented with a suitably engraved watch expressing the appreciation of the Detroit membership for his efforts and interest in their behalf. According to Roy T. Burns, convention chairman, and Charles M. Heemstra, president of Detroit chapter, Adams had carried on practically single-handedly the local administration and convention preparation work which involved any business or office equipment, plus all correspondence pertaining to the convention.

Two New Chapters Admitted

Two prominent items of business conducted by NAPRE's board of directors, prior to the annual meeting, were the admission of two new chapters. This brings the NAPRE chapter total to 32. An engineering group at Indianapolis petitioned NAPRE for a charter under the title of the "Venemann Memorial Chapter". Another group at Houston, Texas, petitioned for a charter, designating themselves to be known as the "Houston Chapter."

Both groups were awarded charters. Acting president of the Venemann Chapter is Anthony E. Wochna, Chief Engineer, Indiana Terminal & Refrigerating Co. and the secretary-treasurer pro-tem, is Jim W. Ludewig, AIRCO, Inc. Acting president of the Houston Chapter is R. W. Ferguson Division Engineer, the Carnation Co. Houston's secretary-treasurer pro-tem is John C. Tyler, Jr., MMM, Inc.

Life Membership Set Back

One petition to NAPRE's board of directors for a life membership for members of over 30 years, was referred back to the By Laws & Finance Committees. The board chairman asked the national president to instruct the Finance Committee to obtain more details as to the cost which should be borne by the Association in granting such memberships, and suggested that the By-Laws Committee submit a proposal which would tighten up qualifications for such a

Welcome speaker for the Detroit Convention of NAPRE was City Safety Engineer Frank J. Drogosch. Mr. Drogosch went beyond the usual Chamber of Commerce presentation and described for the delegates the Refrigeration Operating Engineers License program in the City of Detroit.

Invocation for the 47th NAPRE Convention was given by the youthful Reverend Dr. Robert Young, Pastor, Highland Park Presbyterian Church, Detroit. Flanking Reverend Young are Alvis J. Clay, past president; LeRoy Etzel, president and Charles Heemstra, president of the Detroit Chapter.

Responding for NAPRE to the welcome address was an NAPRE past president, Alvis J. Clay of Memphis. Clay compared accommodations, transportation and similar convention requirements of 1925 and 1941 with the 47th Convention held in Detroit this year. Detroit had been host in those other years. Clay also emphasized the licensing advantages which other cities had enjoyed with the assistance and cooperation of NAPRE, using his own city of Memphis as an example. Clay had formerly been engineer's license examiner for Memphis.

membership if and when the By-laws are amended to include this new classification.

Dues Invoicing Advanced

In the business meeting of the Association, the highlight of several proposals placed before the delegates was a move which changed the fiscal dues policy. The proposal established that the dues collection period would be advanced to October 1, starting in 1957. Members would have 90 days in which to pay their dues in advance. On the 1st of the year those members unpaid would be placed on a suspension list and 90 days later automatically dropped.

Basis for the board of directors' recommendation in support of this change, was the fact that the association's fiscal year ran from Oct. 1st to September 30th in the following year. With the early dues payment date, Association's executives could plan activities for the year without waiting until half the year had gone by before utilizing any of the funds derived from dues sources.

Despite the board's recommendation, it became necessary to have a roll call on this measure. However, opposition to the move changed their mind half-way through the ballot when some of the particulars were again explained to them. The amendment then carried unanimously. Other amendments to the Association By-Laws included the addition of another member to the board of directors, making the total number of directors now 13. The six officers continue to be directors.

The amendment pertaining to the fiscal dues policy also cancelled the practice of issuing withdrawal cards to any members who submit a resignation and to also cancel a reinstatement fee requirement for members who renew their membership within a two year period. Hereafter, a former NAPRE member, or one on the suspension list for non-payment of dues, can be reinstated by merely paying the current year's dues. However, the Association takes no responsibility for providing educational benefits or publications issued during the suspension or period of time in which the member is not an active dues-paying member.

Four-Year Plan Adopted

In the directors meeting which customarily follows the annual convention, the NAPRE board adopted a 4-year plan and program as outlined in the Association's 1956 *Operating Data Book* and the contents in President McKenna's page in Industrial Refrigeration, page 39, November 1956. The board reappointed J. Richard Kelahan as executive secretary of the Association, the first time in the history of NAPRE that it has both an elective secretary to perform the corporate functions

Chapter Clinic in full swing at the NAPRE Convention, with Guy R. King as moderator. Association officers made up the panel. Chapter delegates presented problems of an educational or administrative nature which were answered directly by the national officers according to their jurisdiction or their experience. The session was a lively one and outlasted its assigned time on the program.

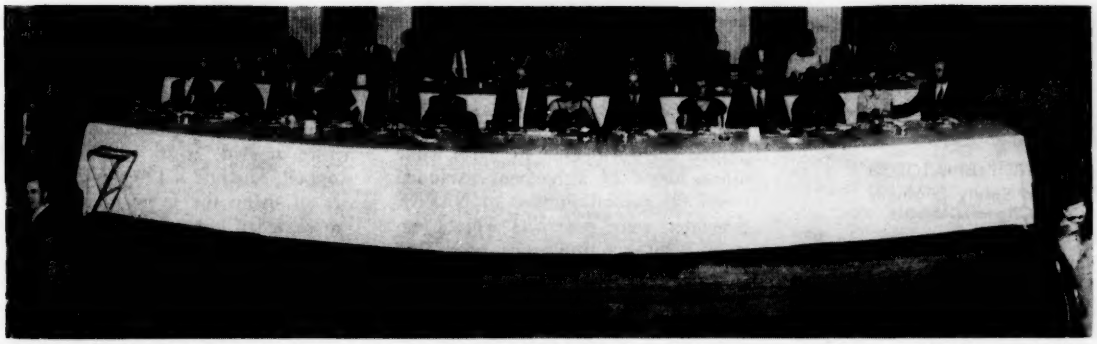
Bert C. McKenna New NAPRE President

BERT C. MCKENNA could be called the typical NAPRE member. Starting with a grammar school education as his principal academic background, he has built on that through experience and outside study, acquiring such information and knowledge in that manner so as to become a chief engineer in his field. Gifted with a knack for handling of men, this quality assisted not only in his present career as an engineer, but gained for him considerable respect from his fellow members of NAPRE and helped advance him through the various top national offices of NAPRE to the position he now holds.

NAPRE's chief executive is a past president of San Francisco and Chicago Chapters, and has held vice-president and director offices prior to his election as president at the 47th Convention. He is an ASRE member. Mr. McKenna's engineering career started in 1927 as an apprentice at Golden State Company, Ltd., San Francisco, under NAPRE Director Mort E. Bell, then Golden State's chief engineer. In 1931, McKenna became a relief fireman, then a temperature man, and finally an operator with Swift and Company at South San Francisco.

During the ice manufacturing season in 1934, Bert McKenna operated for The Old St. Francis Ice Company and then became an operator for the Lucky Lager Brewing Co. in San Francisco. In 1940, he shifted back to his original firm in the engineering field, The Golden State Co., now a division of Foremost Dairies, Inc. For two years he was construction superintendent in charge of erection of diary plants and condenseries in Northern California.

From 1942-1946, his company assigned him to engineering duties in their research division, where he again supervised construction of pilot plants and new developments initiated by his own company, and on Government contracts for the armed services. From 1946 to 1951 he was the supervising chief engineer for the Northern Division of the Market Milk and Ice Cream Departments for that firm. In 1952, he moved to Chicago as supervising chief engineer for Central Cold Storage Company and their four plants in the Chicago area.



Panoramic view of the speakers' table at the NAPRE 47th Annual Banquet. At the top table (l. to r.) Mrs. Betty Robey, Mr. Charles M. Heemstra and Messrs. and Mesdames Frank Chase, Roy T. Burns, LeRoy Etzel, Bert C. McKenna, John M. Mariakis and Hubert Branham. At the lower table, (l. to r.) Messrs. and Mesdames L. L. Adams, C. W. Sullivan, John G. Muller, M. E. Bell, Leland M. Kenagy, Eugene Rytlewski and J. Richard Kelahan.

New Industrial Members of NAPRE gathered around President LeRoy Etzel following the breakfast session on Wednesday, October 31. L. to r. are John C. Tyler, Jr., of MMM, Inc.; Hal Jarvis of Refrigeration Engineering Inc.; R. H. Parlin of Sporlan Valve Company; John G. Muller of Railways Ice & Service Company; Angus M. Casberg, an NAPRE past president and now vice-president of Edinburg Ice & Cold Storage Company; and G. D. Bansch of H. A. Phillips & Co. The representative of Saunders & Co., Chicago, was absent.

Recipients of membership awards at the 47th Annual NAPRE Convention were Louisiana Chapter No. 2, represented by Damian Fischer at left. At the extreme right is Charles M. Heemstra, president of the Detroit Chapter, which took the top trophy. In center, President LeRoy Etzel accepted the trophy for Stockton-Modesto Chapter, whose delegate was unable to be present. Presenting trophies and pictured here between Fischer and Etzel is George N. Paulick, NAPRE national membership chairman 1956-1957.

of the organization and an executive secretary to actively manage the organization's business affairs. The corporate secretary will be elected annually and the executive secretary will be appointed by the Association's board of directors.

Retiring President LeRoy Etzel receives a plaque from newly elected President Bert C. McKenna, NAPRE. McKenna cited Etzel's leadership in the Sacramento and San Francisco Chapters and the culmination of his NAPRE activities as President 1956, as he presented this plaque in behalf of the NAPRE membership.

Chicago Convention In '57

Following a preferential ballot taken on the convention floor on Thursday, November 1, the board of directors on Friday, November 2, approved the selection of Chicago as the 1957 convention site. The board of directors accepted with some reservations an invitation from the Tenth All Industry Refrigeration and Air-Conditioning Exposition which will be held November 18-22 in the Chicago Amphitheatre. NAPRE will endeavor to hold its convention concurrently and encourage its members to attend the Exposition. Details were left to the management of NAPRE's National Office.

Consensus of the NAPRE Board seemed to be that such 48th annual meeting arrangements in Chicago would offer members in one week, what often takes years to observe otherwise; a convention, exposition and contact with other Industry groups.

Two more industrial members of NAPRE presented certificates at Detroit were (left) John C. Tyler Jr., MMM Inc., Houston, Texas; and Wm. H. Krack, Sporlan Valve Co., St. Louis, Mo. Other representatives were pictured in November 1956 INDUSTRIAL REFRIGERATION.

Summaries of Papers Presented at 47th N A P R E Convention

Refrigeration Operator Ordinance

FRANK J. DROGOSCH
Chief Safety Engineer
City of Detroit

DETROIT has required licensed operators of refrigeration equipment since 1916. The regulation has proven workable and is a valuable asset toward the safe operation of all types and sizes of refrigerating equipment. Changes are made in the regulation from time to time as the need arises. There are three classes of licenses. At the present time there are 2092 persons licensed as refrigeration operators. To qualify for a license, a person must have certain minimum operating experience before he is permitted to take a written and oral examination. Of approximately 234 examinations given in the past year, 104 licenses were granted to successful applicants.

Manufacture Inspection Unfired Pressure Vessels

EDW. P. CALLANAN, OWNER
Michigan Ice Machine Co., Detroit

REVIEWED the purpose of ASME code and inspection requirements; then went into the activities of the National Board of Boiler and Pressure Vessel Inspectors. Described how a manufacturer selects an inspection agency and sets up his equipment, shop procedure and test reports to qualify for the "National Board" stamp. Particular emphasis was placed on paragraph U-69 of the Code. Very interesting Question and Answer session followed presentation. Test procedures predominated the the Question Box session.

Contract Maintenance Programs

GUY R. KING
College Refrigeration Instructor
Santa Monica, Calif.

REPORTING on a survey made through the NAPRE membership, a summary of the types of programs offered by refrigeration service and contracting firms was made. The speaker divided the types of programs into four classifications according to the form of contract or agreement written. The principal differences between the forms of agreement or contracts appeared to be in the extent of service coverage. One type of contract provided checking and servicing features, while another provided certain overhaul or replacement features. Even the classes of contracts varied widely. Some included the furnishing of parts while other forms of agreement excluded them. Of special interest to NAPRE delegates were contracts which featured insurance provisions, protecting the owner against the loss during and caused by equipment arrangements. Disadvantages of all contract forms were briefly pointed out.

Preventive Maintenance by Plant Personnel

BERT C. Mc KENNA, CHIEF ENGINEER
Central Cold Storage Co., Chicago

IN ELABORATION on a paper presented before the Management Training Conference of TRRF —NARW in January, 1956, this presentation included a comparison of estimated costs for contracting outside maintenance and repairs with actual costs of performing the same work with plant personnel. Presentation featured cost analysis and slides. In this visual presentation, details were given on the maintenance and service, as well as replacement work for pipe line refrigeration service in the produce district of Chicago. Another illustration compared the cost of performing elevator service and maintenance, including replacement of car cables by plant personnel, as to what expenses would be involved in obtaining such services on the outside. Statements made were convincing arguments in behalf of a firm retaining its own competent maintenance staff, rather than dependence upon numerous outside shops.

Nuclear Energy Power

RUBLE A THOMAS,
Nuclear Engineer
Atomic Power Development Assoc.,
Inc., Detroit

REVIEWED very briefly the types of nuclear reactors developed to date for commercial application. Described Atomic Power Development Associates, Inc. as a non-profit corporation of United States industries organized for the purpose of applying the knowledge and experience of its members and associates and carrying on research to develop atomic power into a commercially practicable means of electric power generation. Then went on to describe, "Developmental Fast Breeder Power Reactor". A series of colored slides depicted schematics and cross sections of nuclear power plants. The speaker went into detail of the arrangement of reactor components, including a description of how the reactors started, were controlled and stopped. The talk led to the probabilities of using the large quantities of low pressure steam by-product for refrigeration applications.

Air Conditioning with Vapor Absorption Plants

T. E. KURTZ
Machinery & Systems Division
Carrier Corp., Cleveland

REPORTED on the discovery of absorption refrigeration in France in the 1700's and it's transplanting to the United States in 1940. Specifically the discussion dealth with the water vapor absorption system utilizing lithium bromide as the absorbent. The two principles involved, the absorbent and the evaporative cooling of water under reduced pressures, were described. Evolution of the machine was handled in a series of four colored diagramatic slide presentations. Questions prompted by a 2-part article in the September and October issues of INDUSTRIAL REFRIGERATION were answered by the speaker following this presentation.

Servicing Truck Reefer Units

V. W. SNYDER, SERVICE MANAGER
Thermo King Corp.
Minneapolis, Minn.

OPERATING engineers of large cold storage, industrial ice, food freezing plants and like facilities are not often expected to tackle the servicing and maintenance of truck refrigeration units in addition to their own duties. However, when a situation does arise where the unit will not perform and a valuable cargo is in jeopardy, it is expected that the refrigerating plant engineer will be familiar with the rudiments of these units and capable of conducting an intelligent investigation of where the trouble might be. Therefore, a smart practical engineer learns as much about units used on the trucks around his plant, as time and conditions warrant.

Foregoing was the approach used as a prologue to explaining latest Thermo-King "Hydra-Drive" models and their application in transport refrigeration. Major components were described. Talk covered minor adjustment and repair, as well as trouble shooting. In question and answer session which followed, inquiries about the Thermo-King railroad unit were answered also.

Mechanically Refrigerated Railroad Car Maintenance

GERALD E. HICKE, MGR.
Transportation Div.
Trane Co., LaCrosse, Wis.

PRACTICAL refrigerating engineers can differentiate between operation and service of refrigerating equipment on transportation vehicles as compared to large stationary applications, if they are aware of certain key service problems. The plant engineer is not expected to be an expert on trouble shooting, maintenance and service of these units. However, his general knowledge and understanding of the basic components should enable him to determine when a system is in need of service, and possibly place him in a position of being able to advise the owner of such equipment as to what the trouble happens to be. Author detailed the key service problems encountered with units installed on mechanically refrigerated railroad cars. Talk was illustrated and the questions brought up in the forum following presentation indicated that a good number of car operating personnel were present.

Field Vacuum Cooling of Loaded Refrigerator Cars

CHESTER R. ANDERSON, PRESIDENT
Gay Engineering Corp.
Los Angeles, Calif.

CHILLING of full-loaded railroad cars, previously reported in INDUSTRIAL REFRIGERATION, appealed to the NAPRE imagination — so the Association Educational Committee arranged the presentation as a convention topic. The full loaded refrigerator car is placed into the tube with car doors open and precools at the same rate as the half car dolly units used in conventional plants. Whole car cooling has some advantage in that there is no rise in temperature after initial chill, as the product is not subjected to picking up heat on its way from tube to the refrigerator car. There is no handling after car has been precooled and towed out of the tube; doors are sealed and ready to move to the market.

The Gay-Vac vacuum cooling plants use rotary type two-stage vacuum pumps capable of producing a vacuum to within two mm. Hg. (0.04 psi) of Absolute. Mechanical refrigeration is utilized for the water vapor condenser, primarily using ammonia as a refrigerant. Plants installed to date (excepting two) have been connected to existing ice plants. Using the condensing side only, this practice allows ice plants to continue making ice when not vacuum cooling. Surplus refrigeration is often used, depending on refrigeration equipment available. Water vapor is trapped within the vacuum system and drained to waste between cycles.

Centrifugal Compressors For Industrial Ice Making

ROBERT F. McKEE
Mechanical Engineer
Pacific Fruit Express Co., San Francisco

ANNOUNCED the application of centrifugal "safe-refrigerant" compressors to a 700-ton industrial ice manufacturing plant at Ogden, Utah. Discussion was presented in two parts; first, "why", and second, how the job was to be done. Estimated cost for construction, including several building innovations, would be approximately $600.00 less per ton with this proposed application than with the conventional plan.

Reasons for the lower cost were noted, advantages of the proposed system cited and salient features given. In "how" portion of the discussion, a description of the installation, ice tank arrangement, brine, water and ice tank flow diagrams were presented. Responding to a question, the speaker pointed out that the proposed plant would not be the first such application. An earlier, but somewhat smaller plant is in operation in Colorado.

Food Freezing Practices

FRED L. YOUNG, JR.
Vice-Pres., Chief Engineer
Freezing Equipment Sales, Inc.

COVERED four types of freezing installations made popular during the past few years: (1) Air blast automatic package freezer, (2) Air blast loose product belt tunnel, (3) Air blast buggy tunnel for pies, (4) Plate froster for packaged goods. All were new and novel presentation in such a technical meeting. Slides were used. A question and answer period followed the prepared presentation. Advantages and drawbacks of each system fairly pointed out. No trade names were attached to equipment shown or discussed.

Practical Application of Hermetic Centrifugals

ROBERT LOEBL
Centrifugal Compressor Dept.
American Blower Corp.

DEVELOPMENT of hermetic construction as applied to centrifugal refrigeration equipment has been very rapid. Success of hermetic centrifugals is chiefly due to machine's operational characteristics, ease of control and reliability, as the heart of any central station process or air conditioning plant. Discussion covered the general design objectives and history of development; operation of the machine with emphasis on control; installation and routine maintenance and service. Thus far, the machines are limited in application to refrigerating water or process fluids in the conventional air conditioning chill water temperature ranges.

General Motors Tour

Feature Field Trip
One of Seven Offered

TIMELY engineering field trips as a mid-week combination social-educational diversion from the business-engineering routine, have been one of the attractive NAPRE convention features for years. This year was no exception. The feature field trip for the 47th annual meeting was a tour to the very famous and highly publicized General Motors Technical Center, Warren, Michigan, October 31.

Air Conditioning Facilities

For summer months most Tech Center buildings are air conditioned. Each group of buildings has its own high velocity system. The air is changed 6 to 15 times an hour in the various buildings. The numerous systems employ anywhere from one to as high as 60 condensing units, ranging from 15 to 20 tons each, except the cold test laboratory. Units in the laboratory are three York Corporation centrifugals typical of the brine-chiller-condenser units. All other condensing units are, of course, Frigidaire installations.

Members of the Michigan Chapter No. 1, NAPRE, Detroit, on the staff of plant engineer, Fred H. Couts, who served as guides to the delegates were James Conboy, Edw. Fylan, Donald M. Greene, Charles H. Bankert, Robert E. Cover, George H. Durie, Clayton A. Mote, and James T. Greely, Jr.

Other field trips scheduled by the Detroit committee and handled by William Appleton were tours to Northland Center, Gelatin Products Corp., The Stroh Brewery Co., The Fred Sanders Corp., City-County Building, and Statler Hotel. On the non-engineering side of the tour list were visits to Greenfield Village, The Ford Museum and the Plymouth Motor Car Corporation Assembly Plant.

From the President's Desk

Personal Friendship Benefits Derived From Convention Attendance

ALONG with educational advantages one receives by attending NAPRE Conventions, the most attractive extra benefit is not only the opportunity of renewing old national acquaintances but also the wonderful additions each meeting to a person's group of friends. Among the list of friends acquired this year, many attendants became acquainted for the first time with the new Industrial Members and their representatives.

Cites Industrial Members

Delegates were happy to honor Industrial Members at the special breakfast session held to present certificates of membership to their representatives. However, as if their participation as Industrial Members of NAPRE were not enough, these old friends now engaged in more active NAPRE roles, saw fit to express their faith in NAPRE's aims and objectives. Following are direct quotes from their Industrial Membership acceptance remarks:

Hal Jarvis, representing Refrigeration Engineering, Inc., Los Angeles, stated that Recold's motive in joining NAPRE as Industrial Members were two-fold: "First of all, we believe that any product's success in the field depends not only on the engineering behind it and the material of which it is made; but *most important,* on the manner in which it is installed and maintained in the field. Hence, NAPRE's educational program demands our first attention, now that your ranks are open to Industrial Members.

"Second — a purely selfish motive — some of what we feel are Recold's most outstanding design contributions to the industry have come directly from the Practical Refrigerating Engineer! Hard to believe? It's the truth!" . . . and he gave many examples.

Representing H. A. Phillips & Co., Chicago, was G. D. "Dan" Bansch. His message for the Phillips firm included these complimentary remarks: "Our firm, as you know, is not a stranger to the NAPRE. The founder was an active members and attended many national conventions. When we ship a float control or a liquid return system, we like to feel that it will perform a useful service. Before it can do this, however, it has to be installed properly and in many cases its satisfactory operation depends upon the knowledge and the techniques used by the operating engineer.

"Since the majority of our products go to installations which have operators who are qualified for membership in an organization such as the NAPRE, and also because we have found that the type of men who are active in NAPRE make the best use of the equipment they operate; for these two reasons we have been and continue to be interested in the NAPRE educational program."

New Firm Lists Advantages

A firm comparatively new in the accessory line to the refrigerating field, added weight to the previous verbal boosts: "We were originally interested in NAPRE by the late George Bright, an old time friend of my father. Mr. Bright, on several occasions, discussed the refrigeration and insulation industry. During these discussions he remarked several times that we should join one of the organizations connected with this industry and recommended NAPRE because:

"Many of the best men in the industry belong.

"Their friendship and advice over the years would be invaluable to us.

"The friendship of these men had meant a great deal to him.

"NAPRE is a great benefit to its members because of the educational nature of its work and many of its members would not have risen to their present status without its help. Therefore we would be supporting, more than just a social organization, a useful educational tool which benefited the industry and its entire membership.

"That George Bright's remarks were true we have since learned in the four years that our sales engineers have been associate members of NAPRE." — John C. Tyler, Jr., MMM Inc., Houston.

Although unavoidably detained, W. H. Krack, Sporlan Valve Co., St. Louis, was represented by R. H. Parlin, who expressed their firm's policy in these words: "We are confident that there will be continued growth throughout the industry. Our past experience has clearly demonstrated that a continual educational program is the primary method by which those who are currently employed can enlarge upon their talents to make further progress possible in the entire industry."

NAPRE is proud to welcome these friends, as well as the Edinburg Ice & Cold Storage Co., Texas; Railways Ice & Service Co., Kansas City; and Saunders & Co., of Chicago, to the new Industrial Membership class.

Monthly Report Honors

Chapter delegates at Detroit who were thrilled to see Stockton-Modesto, one of the Association's smaller units, nail down a membership trophy, will enjoy their cake-eating ala mode this month. In the opinion of your president, the best report citation on a chapter program goes to another small chapter, Colton.

From this page also, it is my privilege as national president to extend the sincere Christmas Greetings of NAPRE's Officers and Directors, to the entire membership and NAPRE's friends in the Industry.

Bert C McKenna

Officers NAPRE, 1957

Bert C. McKenna, President
Chief Engineer, Central Cold Storage Co.
Chicago, Ill.

Frank L. Chase, Vice-President
Chief Engineer & Building Supt.
Hibernia Bank Bldg., New Orleans, La.

Roy T. Burns, Vice-President
Refrigeration Inspector, Bureau of Safety
Department of Public Welfare, Detroit, Michigan

Leland M. Kenagy, Treasurer
Chief Engineer, Kansas City Plants
Railways Ice & Service Company

J. Richard Kelahan, Secretary
Techn. Editor, Industrial Refrigeration
Chicago, Ill.

Cecil W. Sullivan, Sergeant-at-Arms
Chief Engineer, Lowenstein Bros.
Memphis, Tenn.

John N. Mariakis, Board Chairman
Chief Engineer, Claiborne Towers Hotel
New Orleans, La.

Hubert B. Branham, Director
Division Supt of Refrigeration
Pacific Fruit Express Co.,
Pocatello, Idaho.

R. A. O'Neill, Director
Vice-President, Texas Ice & Service Inc.
Corpus Christi, Texas

John G. Muller, Director
Chief Engr., Railways Ice & Service,
Kansas City, Kans.

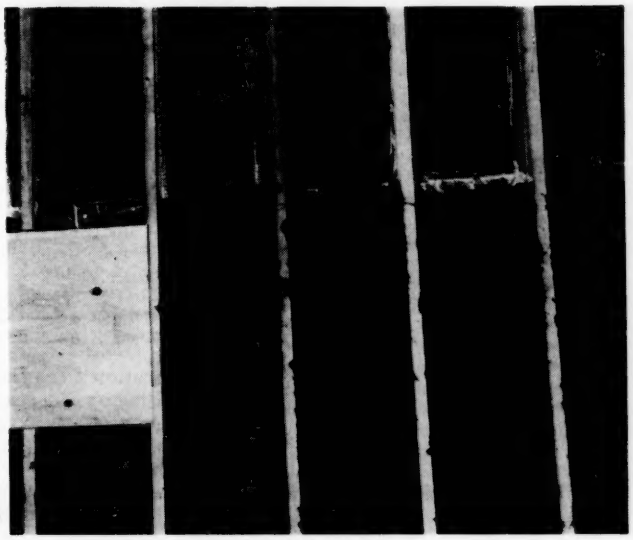
M. E. Bell, Director
Superintendent of Engineering,
Sick's Brewing & Malting Co., Seattle

Eugene Rytlewski, Director
Engineering Assistant to President
City Products Corp., Chicago.

LeRoy Etzel, Director
General Superintendent of Refrigeration
Pacific Fruit Express Co., San Francisco

Stop vapor and heat leaks with VOID-FREE PALCO WOOL® Insulation and complete open wall inspection

1 Vapor barrier is completed *before* application of insulation, allowing full inspection to eliminate all possibilities of breaks or unsealed penetrations of the vapor barrier.



2 Void-free method of placing *Palco Wool* in the entire wall *before* interior finish is applied allows complete inspection of insulation to eliminate any possibility of voids or pockets.

At recommended density of 4.5 lbs./cu. ft., *Palco Wool* has the inherent resilience to stay in place without support of interior finish construction. It displaces so much air that convection currents are virtually eliminated. Impervious to moisture effects and deterioration, it has no intermediate vapor dams to trap moisture and lower efficiency. There are no joints or edge leaks. Complete inspection eliminates possibility of pockets or voids. Application of interior finish is completely independent of insulation placement.

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1. Vapor barrier and support members for finish wall are completed before insulation is applied, allowing full inspection to eliminate vapor leaks.

2. *Palco Wool* is packed behind temporary retainer sheet.

3. *Palco Wool* is packed behind second temporary sheet.

4. Lower temporary sheet is removed, placed above second sheet, and packing process is continued. Process is repeated until entire wall is packed.

5. Temporary sheets are removed, and entire wall is inspected to determine that there are no pockets, voids, settlement. Interior finish is then applied.

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Company_____

Address_____

City_____ Zone____ State_____

Temperature Indicating By Radio Waves?

QUESTION NO. 1139: I recently read in a new magazine that the Naval Research Laboratory detected radio signals from Mars and therefore concluded that the planet Mars has an average temperature of about 32 F. Is this a new means for measuring temperature? If so, why couldn't the principle be used in temperature measuring instruments?—F. W., New Orleans, La.

ANSWER: It is important to remember that all bodies give off electromagnetic radiation over a wide range of frequencies. We classify the radiation as light, ultraviolet, radio, infra-red, etc., depending upon its frequency. In other words, all eletromagnetic radiation is essentially the same except that its frequency determines the way in which we feel it, or identify it.

There are a number of instruments which indicate temperature by measuring the radiant energy from a body. The optical pyrometer used to determine furnace temperature is a good example. The radiation pyrometer is another instrument commonly used. However, natural radio waves are so affected by surroundings and are such relatively weak signals that instruments employing that principle would not be practical.—H. P. Hayes.

Excessive Ells and Fittings Reduce System Capacity?

QUESTION NO. 1140: Is there any set of charts available for sweat fittings in the 5/8 to 2 5/8 in. sizes that will show the pressure drop for Refrigerants -12 and -22 through short bend (standard radius) ells as compared to long sweep (long radius) ells, at low temperatures of minus 5 to minus 40F?

We have a freezer cabinet designed to operate at minus 40F. Refrigerant -12 is used and the system condensing unit same as used successfully in hundreds of similar sets. This particular unit is not getting full capacity. The installer used 80 ft. of 1 1/8 in. suction with five standard ells and an additional 75 ft. of 7/8 in. suction with 15 standard ells. Long sweep ells were specified. Charts requested may prove difference in pressure drops between ell designs as accounting for capacity shortage.—J. S., St. Louis, Mo.

ANSWER: Friction of any pipe fitting can be stated in terms of equivalent diameters of straight pipe irrespective of the fluid carried. *Mark's Mechanical Engineers' Handbook* gives the equivalent length of a short turn ell as 30 diameters and a long turn ell as 20 diameters in sizes from 1.0 in. to 4.0 in. The diameters considered are the inside diameters.

The length of 1 1/8 in. OD pipe that would have a friction equivalent to the five 1 1/8 in. OD short turn ells would be:

$$5 \times 30 \times 1.0/12 \text{ or } 12.5 \text{ ft.}$$

The length of 7/8 in. OD pipe which would have a friction equivalent to fifteen 7/8 in. OD short turn ells would be:

$$15 \times 30 \times 0.75/12 = 28.1 \text{ ft.}$$

If long turn ells were used, their friction would be two-thirds of the above values. Therefore, the loss of capacity could not be ascribed to the short turn ells. However, if the pipe size is too small for the capacity of the system, considerable reduction of system capacity could result from the friction in the pipe. This factor cannot be checked from here without knowing the capacity of the system.—H. P. Hayes.

NAPRE

Question Box

The National Educational Committee, NAPRE, answers monthly in this column, operating problems forwarded by members. The Committee appreciates answers from the field. Address questions and answers to Prof. Harold P. Hayes, Dean of Engineering, State Polytechnic College, San Luis Obispo, Calif.

Refrigeration Uses In Blood Plasma Processing

QUESTION NO. 1141: Can you describe briefly the process for refrigerating blood plasma? What temperatures are involved and what type of equipment is used? Are there any extensive installations or is this always a small scale operation?—A Blood Donor Chairman, Chicago, Ill.

ANSWER: Chapter 35 of the *Applications Volume*, 1954-55 *ASRE Data Book* is entirely devoted to the preparation and freezing of blood plasma. This chapter moreover has an extensive bibliography from which the matter can be further investigated. A limited discussion only will be given here.

Preservation of plasma in the frozen state is recommended by medical authorities as the safest, most efficient, and practical method for the average hospital. Almost any hospital can easily maintain its own store of frozen plasma. Under favorable conditions a large institution may assume the responsibility of processing and supplying frozen plasma for neighboring institutions. A plan of this nature has been operating successfully for several years in the Cincinnati General Hospital under Dr. P. I. Hoxworth. The service is reported as supplying the needs of 14 hospitals with a total bed capacity of 4,235.

I will not go into the details of the equipment since dehydration of the frozen product is also involved. These details may also be found in the same reference above. Blood plasma freezes at 31° F. Temperature of freezing has little or no practical effect on the quality of the final product (between 10 and -100° F). — H. P. Hayes.

New Refrigerants, or New Names?

QUESTION NO. 1142: In October, Question No. 1131, the term "Refrigerant-12" is used. Is this another new so-called safe refrigerant, or a general term for all brands of dichlorodifluoromethane?—G. V. O'N., Chicago, Ill.

ANSWER: In order to avoid confusion in the designation of similar refrigerants manufactured by separate companies, the Kinetic Chemicals Company has offered its numbering system to the entire refrigerating field. Thus Refrigerant-12 would include all brands of dichlorodifluoromethane.—H. P. Hayes.

Neoprene For Portable H_2O Tanks?

QUESTION NO. 1143: Rubber protective coating described on pg. 8, August I. R., suitable for brush or spray coating may solve some of my interior tank coating problems. Can it be used in hot water tanks for human consumption? Will it contaminate food or water for human consumption? Is it toxic to apply?—J. A., New Orleans, La.

ANSWER: I am always reluctant to comment on specific applications of protective coatings. In general, it is best to deal directly with the manufacturer or his representative in such matters. He will have data available which he can best interpret for you. Since your question did refer to a specific material, IR's Reader Service obtained the following reply, which is typical of frank comments most manufacturers will give to inquiries regarding limitations of their products.—H. P. Hayes.

"Rubber-Coat Liquid Neoprene is **not** recommended for use at temperatures over 180 F and, thus, we would not recommend this for hot water tanks if temperatures are going to rise above this.

"Your other question relates to whether there is any toxicity in this material which would affect human consumption of foods or water. To the best of our knowledge, there is no adverse effect once the coating is completely dry and free of solvents. During the application, however, the solvents are considered toxic to the applicator and forced air would have to be supplied in an enclosed area."—D. E. W., Boston, Mass.

New Questions

Seeks Method For Computing Booster Compressor Capacity

QUESTION NO. 1144: How do you go about finding the capacity of a booster compressor? Suppose I had a 5½ x 6 in., 4-cylinder compressor running at 450 rpm and suction at 0 pounds. What would my compressor capacity be?—E. T., Yakima, Wash.

Why Should New Apples Be Separated From Mature?

QUESTION NO. 1145: I know that apples intended for long storage should be stored separately from more mature apples. What I want to know is WHY this difference is necessary? It seems to me that storage temperatures should be about the same and so long as I take the fruit out at the

right time, what difference does it make if I mix non-mature and mature apples in the same room?—R. T. B., Michigan No. 1.

Refrigerating Principles Apply To Local Anesthesia?

QUESTION NO. 1146: I have heard of the application of refrigeration as an anesthetic in some cases of surgery. Has this really been done? If so, what fundamental principle is involved?—C. A. H., Chicago.

The "Why" Of Floor Heaving

QUESTION NO. 1147: I know that water under a floor, when it freezes, can cause heaving and damage to the floor. What I don't understand is where the force comes from to cause the heaving. How can the simple freezing of water produce enough force to crack concrete floors?—E. F., Venemann Chapter.

Is Radiation Important To Heat Gain Calculations?

QUESTION NO. 1148: In calculating heat gains, I can understand convection and conduction but radiation gives me trouble. Aren't there any good rules of thumb for calculating radiation heat gain? This business of time lag, emissivities, and other factors seems more complicated than it should be.—G. A. P., Calif. No. 2.

News Notes and Chapter Activities

Orange Processing Plant Toured By Colton Chapter

COLTON—Oranges have always meant a great deal to members of California Chapter No. 5, from the viewpoint of financial welfare, since most members in the San Bernardino locality are employed in refrigeration operation where citrus fruits are the predominant product requiring such service. However, respect for the industry increased and the members own knowledge broadened as a result of a visit to the Exchange Orange Products Company, Ontario, California, October 10. Members and friends were guests of Carl Hooker, Utilities Engineer for the Exchange Orange Products Co.

The visit was a full-fledged inspection trip through the plant. Observed were process operations for manufacturing juice, oils, pectin and various kinds of concentrate which are used in food, baking, confectionery, ice cream and beverage industries, for flavoring of food products and drinks. Members noted that even the waste pulp is dehydrated in large kilns and processed for dairy cattle feed.

Orange Storage at 34 F

Perhaps most interesting of the various processes, was the juice extraction activity. Visitors observed the oranges being fed mechanically through the cutting and juice extracting machines. Each orange is cut in half and fed to a rotating extractor. The juice obtained there is pumped through stainless steel piping to separators, filters and then to other process points. Orange juice intended for storage is barreled in 54 gallon containers and placed in a very large cold storage room held at 34 F.

As always, the members enjoyed spending some time in the compressor room. This plant is a 700-ton capacity. Two large Carrier compressors are utilized for freezing operations, while smaller compressors can be utilized for various utility applications and for chilling purposes. Visitors had the opportunity to express their appreciation to Mr. Hooker and the Exchange Orange Products Company at a coffee and donut session held in the plant cafeteria following the tour.

Members, their friends and families, enjoyed the annual Colton NAPRE picnic at Devils Canyon, North of San Bernardino on September 12, among the pines under a clear sky and a new moon. Everybody enjoyed the hamburgers, salads, baked beans and all the trimmings with coffee and other refreshing drinks. As in the past, everyone enjoyed this outing which opened the fall program.—*Harry Bonter.*

Vestibule Icing Problem Presented to Memphis

MEMPHIS—Following a review of fundamentals conducted by chapter instructor H. L. Todd, past national presidents Alvis J. Clay and Charles A. Conley presented a vestibule icing problem as a part of the Question Box session. These members described how warm humid air would enter from the outdoors and condense on the interior of the vestibule structure which projected into their low temperature storage rooms. When the rooms were sealed up for storage and no traffic moving through the vestibules this condensation froze. When the rooms were again open for traffic some of the previously formed ice melted and ran onto the floors while more condensation collected on the walls and ceilings of the vestibule.

Different suggestions were put forth by many of the members on how to stop this phenomena from taking place. Conley told them how he had submitted his problem to the National Question Box in INDUSTRIAL REFRIGERATION and related a few of the replies he had received from members of the NAPRE Educational Committee. He then related the solution that his firm had settled on. This solution will be reported in a later issue of INDUSTRIAL REFRIGERATION as a reply to his own question. At this meeting James O. Tankersley, Manager, Winter Garden Freezer Co., was elected to membership.—*C. A. Conley*

Michigan Rolls On

DETROIT—Not content at resting on such laurels as membership contest winning and champion small chapter convention host, Michigan Chapter No. 1 swung back into its routine on November 8. The convention, of course, concluded on November 2, but on the 8th the chapter was right back at its refrigeration class at 7:00 p.m. in Room 112 of the Wilbur Wright High School. On November 13 the regular business meeting was held at Grand Cafe, preceded by a choice of Swiss steack or roast chicken dinner. Concluding reports on the financial success of the 47th Convention were made and election of officers followed. Announcement of the new officers will be made with their installation at the Christmas party.—*L. L. Adams.*

The two proud fathers pictured in photograph above are chapter Vice-President J. E. Machut and the chapter instructor, F. J. Scherer. Scherer is the happy father with the twins perched on each knee. Right, general view of the tables and family participants.

New Refrigerating Equipment So. Calif. Meeting Topics

LOS ANGELES—Recent developments in the fields of industrial pumping equipment and refrigeration plants were described by Rudi F. Kettler, engineer, Fairbanks-Morse Company, Los Angeles Division, at the November 7th meeting of Los Angeles Chapter, NAPRE, in the Terminal Club auditorium. Adsorption plants were the discussion subject at the October 17 meeting.

With factory models of a packless pump, a pancake motor driven refrigeration unit, a new ammonia pump, and other items set up for demonstration purposes, Kettler presented the most comprehensive program on pump equipment that the NAPRE members have heard in the South California area for several years. He first described and demonstrated an axial airgap or pancake motor which, he said, was not exactly new, but in this case represented a new application, being designed for direct connection to high-speed compressors. The size of the motor under discussion, Kettler said, runs only up to 10 hp at speeds of 1200 rpm, and is strictly a small motor application, because in higher hp's the diameter would get too great and the advantage of a pancake would be lost to excessive diameter. Engineering staff members of the Fairbanks-Morse organization took the pancake motor apart while Kettler described it part by part.

New NH_3 Pump

Kettler next described and demonstrated a new ammonia pump which, he stated, was different in respect to its seal construction and the number of seals, as well as the bearings. The pump uses two seals, both pressure actuated. If the first seal goes out, the second seal comes into play. Pump has three ball bearings—two to keep the shaft very rigid and prevent quiver in the seals; and a third ball-bearing to take the V-belt thrust.

Kettler next described and demonstrated a ceramic seal used on a horizontal evaporative condenser pump. The seal, according to the speaker has reduced the Fairbanks-Morse Co.'s service expense per unit by 75 percent. He declared that the company has found that regular water seals are not too good on evaporative condenser and cooling tower applications where treatment is used. Ceramic seals in the horizontal unit have proven quite satisfactory.

The next part of the evening's program involved a demonstration by Kettler and his assistants of a packless, sealess evaporative condenser and cooling tower pump. According to the speaker, the packless unit has less working parts than the horizontal job. A total of 34 models were made during the experimental period before a satisfactorily working unit was achieved. The goal was to design a machine which would keep running and not leak water into the motor or on the floor, or not leak at all under conditions of complete shut-off, a partial shut-off, or running at design point; and also pull a vacuum.

He cited the following features: the pump has standard clearances; it stays in hydraulic balance at all times; it runs normally at 30 food head, flooded suction; it has water bearing at top of the impeller and at the bottom, which is standard with closed runner pumps; there is no metal-to-metal contact.

Industrial Absorption Units

Program on October 17 offered a presentation of recent developments in design, installation and operation of absorption systems in industrial plants. Speaker was Warren B. Ludwig, chief engineer, San Francisco Division, York Corp. He was introduced by Axel Dalin, chief engineer, York's Los Angeles branch. Other York technicians who served as projectionist and assistants were Thomas A. Marshall, sales manager, York, and C. P. Strickland and W. J. Bauman of the firm's Los Angeles sales engineering staff.

Ludwig first described the functional details of absorption operation and followed with a description of an absorption installation set up by the York Corp., in Stockton, Calif., why the absorption system was chosen for that operation, and how it worked out in practice. With illustrated slides, Ludwig gave the Los Angeles chapter members a comprehensive idea of the engineering features of the Stockton installation, and of its various component units such as absorbers, controls, liquid route through the system, etc. He also described an absorption plant in use by the Shell Oil Co. in Downey, Calif.

The chapter got off to a running start in the 1956-57 membership drive by accepting seven new members at the October meeting. These were Don Calori, John F. Daly, Frank W. Kroger, Jr., Donald Renfrew, W. Waldrop, H. S. Christiansen and Carl A. Morris. President Clifford P. Scott appointed Lawrence Benedict as delegate to the Detroit NAPRE convention: with, George Paulick, W. R. Burnett, Guy King, Regis Gubser, E. T. Quinn and Joseph Granger as alternates. President Scott also appointed a nomination committee, with Rudi F. Kettler as chairman, which is to prepare a slate of candidates for 1957 chapter offices. Balloting will take place at the December 3 meeting. Committee members are Burnett, Quinn, Paulick, Gubser, Michael Julius, Ed L. Nelson and Victor Stubblefield.—*Fred Herr*

Tacoma Elects Officers

TACOMA—Washington Chapter No. 2 elected officers at their October meeting. Members elected to staff positions for 1957 are President — Merle W. Halley, machinist and maintenance, Heidelberg Brewing Co.; Vice-President — Clarence Mase, chief maintenance engineer, Carstens Packing Co.; Secretary-Treasurer — James Bennett, assistant manager, Tacoma Ice Co.; Sergeant-at-Arms — Glenn A. Jenkins, maintenance, Tacoma Milk Producers Association and Educational Chairman — Archie L. Waterbury, chief engineer, Heidelberg Brewing Co.—*Jim Bennett.*

Basic Refrigeration Course At Chicago Chapter

CHICAGO—NAPRE's Refrigeration Course, "Basic Refrigeration" by Guy R. King, will continue to be the principal feature in refrigeration classes conducted by the Chicago chapter. Opening their fall meetings on September 11, Chicago chapter presented instructor Gene Rytlewski who covered Chapter 22 of the course, on Refrigerant Lines—Pressure Drops. After a brief review of the chapter 22's contents, Rytlewski handled problems from the floor, showing members how to use the charts provided to them with their Basic Refrigeration course.

At the October 9 meeting, Art Christensen, chief engineer for Booth Cold Storage and Booth Fisheries was the instructor. He reviewed Chapter 23 of the refrigeration course, dealing with Brine in Refrigeration. Christensen elaborated on the text by describing in greater detail the various brines commonly found in refrigeration uses and some of those that were rather uncommon. He cited the various applications and emphasized the degrees of corrosiveness with each. His talk included a few practical hints on how to free-up brine coolers which had solidified. Advantages of brine systems was presented with respect to direct expansion systems, and a few problems in brine-making were worked out for the newer members.

Centrifugal and Refrigerants, Featured Speaker Topics

Centrifugal compressors was the topic of the featured speaker at Chicago's September 11 meeting. Member Jack McKinley, Carrier Corp., reviewed this type of system for the meeting attendants, with particular emphasis on purging operations.

At the early October meeting, Mike Parker of Refrigerants, Inc., representing the General Chemical Division of Allied Dye & Chemical Corporation presented a short talk on the so-called safe refrigerants. He supplemented his talk with movies which explained how corrosion gets started in a system using such refrigerants. The film also contained suggestions for preventing the infiltration of air and water vapor into such systems.

Brewery Tour

In lieu of a meeting on September 25, Chicago Chapter members and guests toured the Canadian Ace Brewery. A buffet supper was enjoyed prior to a general tour of the brewing plant. Canadian Ace Vice-President Abe Leverant welcomed all the members and addressed them with a short talk on the importance of refrigeration to the brewery, pointing out the actual applications that refrigeration has in the beer manufacturing process. Several of the plant's engineers were introduced. These gentlemen then conducted members on the tour. The refrigeration machinery is older type equipment, one compressor actually being 50 years old. However, the machinery was all in good operating condition and doing an efficient job.—*Bill O'Reilly.*

Iowa Chapter Starts Basic Refrigeration

SIOUX CITY—Scholastic activity occupies most of the time of the local chapter NAPRE at Sioux City. During October, the new refrigeration class was formed with five new members of the chapter enrolling with the previous attendants. Instructor member, Dale Brady, has reviewed the first two chapters of the Basic Refrigeration text and the classes are now engaged in a thorough review of Chapter three. Discussed thus far have been heat and temperature relationship, their properties and effect; the various refrigerants, their properties and capabilities, and which refrigerant is best suited for the different installations.

Refrigeration Classes

Refrigeration classes in Sioux City are held in the Technical High School. Through NAPRE efforts a number of pieces of equipment have been donated to the NAPRE activity and the High School shop. A 3 x 3 York compressor has been loaned to the chapter by C. R. Thomson, Manager, Central West Ice & Cold Storage Co. Three other small condensing units have been made available, including one which is donated by Frank Pilley & Sons, a division of City Products Corp.

Library of Material

A substantial library of material on different products for the refrigerating field, and even some text books have been received by the chapter. Cabinets are planned for the storage of these books and pamphlets, with a check out service to those members who wish to take the material out. The Program and Educational Committee had been concentrating their efforts on obtaining technical speakers for the year to supplement the refrigeration course instructors. Chapters carry on considerable correspondence in obtaining visual aids for our class room work.—*Vern Howard*

Two Brewery Inspections, Social For St. Louis

ST. LOUIS—Most chapters would consider it quite a privilege to be able to work in one annual tour to a brewery in their locality. However, St. Louis chapter members were given a double treat in the first two months of their fall program with a trip to the Griesedieck Bros. Brewery for their first September meeting, followed by a tour of the Falstaff Brewery for their initial October meeting. In the way of explanation it should be pointed out that retiring chapter president E. Lotte is the acting chief engineer at the Griesedieck plant while his successor E. Kessler is the chief engineer of the Falstaff Brewery.

Between the brewery visits the chapter also managed a social, the annual bar-b-que. This affair was held on Saturday, September 30. Members and their families enjoyed plenty of ribs, beer and soda. In the recreation line a softball game, some poker and canasta for the ladies livened things up. Sam Craul produced a basket of candy apples as a special treat. Children of the members found themselves hard pressed by the adults with regard to consuming these delicacies.

Refrigerant Types Discussed

At the opening fall meeting at the Griesedieck Brewery, member Hugo Reichenbach, Frick Company, was the featured speaker. He presented a general discussion on the development of the halogenated refrigerants and their uses. The speaker covered not only the types or classifications of these refrigerants, but instructed the members on the characteristics of each gas, where they are best applied and what types of compressors were utilized.

At the Falstaff plant, Clarence Johnson was the speaker and his topic concerned principally the plant itself and the refrigeration uses therein. A short business meeting was held on this occasion and it was followed by a tour of the plant previously described. At both plants the meeting ended with refreshments.

An interesting item of business of the October 5 meeting was the selection of Gurdon Uplinger, Swift & Co., East St. Louis, Illinois, as the St. Louis delegate to the 47th Annual Convention. Alternate delegate was Elmer Oexner, Duquoin Paking Company, Belleville, Illinois.—*E. Lotte.*

(Continued on page 42)

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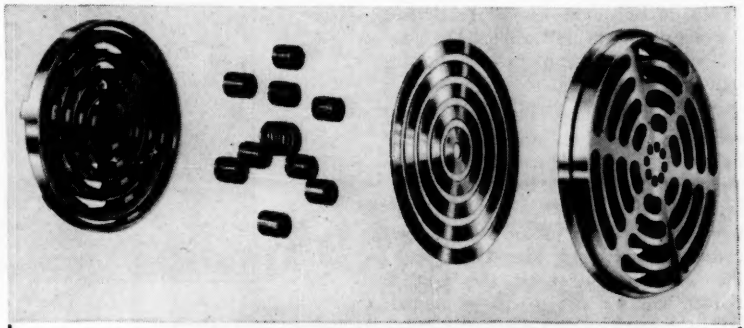

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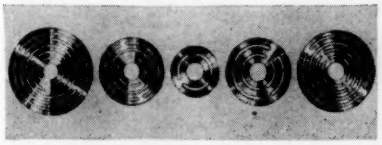

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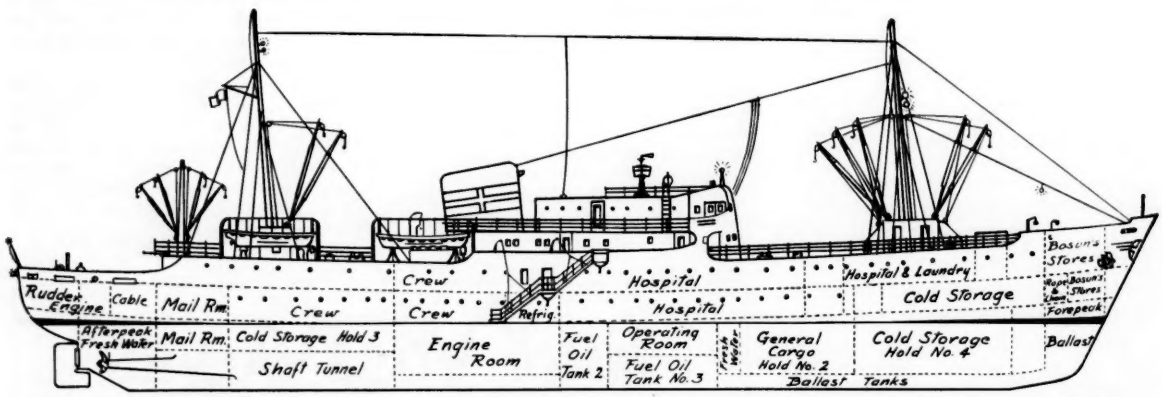
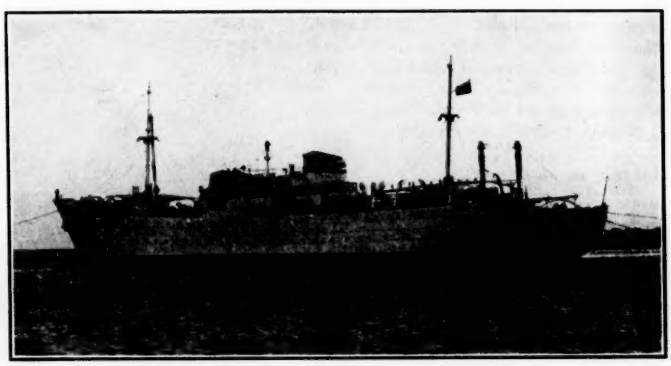
New Portuguese Ship has Modern Refrigeration Equipment for Serving Fishing Fleets



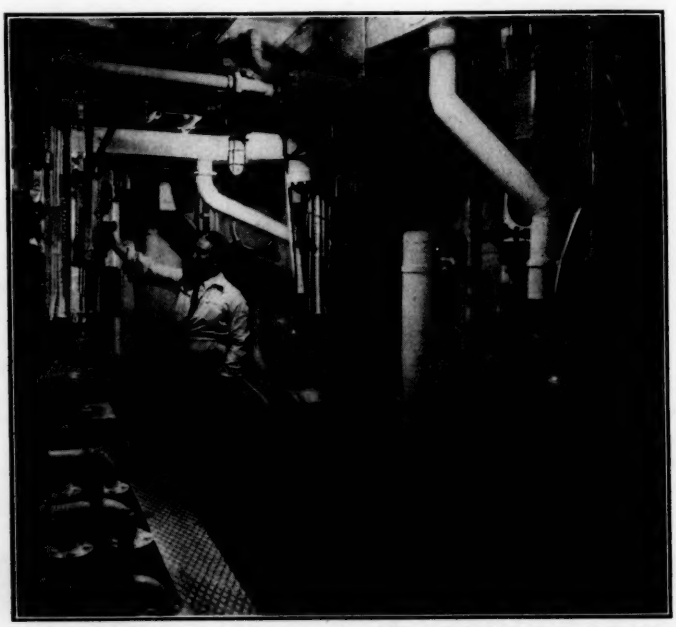
Section through the Portugese Mother Ship "Gil Eannes," showing the refrigerating machine room amidships.

THE "Gil Eannes," a "Mother Ship" was built in 1954 for the Gremio dos Armadores de Navios da Pesca do Bacalhau, by the Estaleiros Navais de Viena do Castelo. The vessel, which sails out of Lisbon, Portugal, is 300 feet long.

The "Gil Eannes" has three large refrigerated holds, and one deck, held at a temperature of minus 4 degrees F; in these, frozen fish bait is carried from distant points to the hook-fishing ships of the Portuguese codfish fishing fleet. The ship crosses the Atlantic to reach the Grand Banks, where a cargo will be loaded from freezing plants on shore. She stays there, and then on the seas of Greenland, providing the fishing fleet with medical and surgical assistance (for which she has a modern fully equipped hospital aboard), religious assistance, food, frozen bait, materials, equipment, workshop services and mail, during all the fishing campaign, that lasts for an average of six months. Her capacity for frozen transport is about 1000 tons, usually in packages of some 60 lb. each.



The New "Gil Eannes" Afloat



Augusto da Silva Godinho, chief engineer, checks over the refrigerating machinery on the "Gil Eannes."

Electric power for operating the refrigerating system is furnished by 220-volt D.C. generators, driven by Diesel engines.

On this ship, the General Electric Portuguesa, Frick Distributors in Portugal, installed a complete automatic refrigerating system, charged with Refrigerant 12. The main items of the plant include five "Eclipse" compressors, each with three cylinders, mounted on channel-iron bases and arranged with both unloaders and capacity controls; two two-cylinder "Eclipse" compressors

were also supplied, one being for the storage of food for the crew. Eleven special air cooling units were placed in the holds; six of these are arranged with up-blast outlets and the others for front outlets.

The shell condensers have tubes of Admiralty metal, the tube sheets being specified 10 percent Monoclad. The seven seawater pumps are all-bronze, with stainless-steel shafts. The seven Freon receivers are vertically mounted. The controls are very complete and include Alco valves, low-pressure and high-pressure cutouts, oil-pressure safety switches, Henry driers and liquid indicators, M.H. thermometers (some of which have warming devices), temperature controls, relays, etc. Over 170 tri-flex and similar deflection registers were furnished for use on the ducts from the air units, and a complete set of repair parts for the compressors and air units was supplied in accordance with Lloyd's requirements.

Drums of Freon, Frick Eclipse compressor, and other equipment in the refrigerating machinery room of the Mother Ship.

Joao Pereira Ramalheira is captain of the Gil Eannes, and Augusto da Silva Godinho is chief engineer. The vessel has been in service about a year. The photographs plainly show the vertical receivers and spare drums of Freon as well as the ventilating system, with outlets above each compressor. The condensers are mounted overhead. The engineer in the white suit is Senor Augusto da Silva Godinho. The excellent workmanship and the beautiful finish given the equipment are obvious at a glance.

Butter Sales Suspended

AS OF September 30, CCC uncommitted supplies of butter were again down to zero and sales necessarily suspended temporarily. It is expected that government butter purchase will remain low during the fall months of low production.

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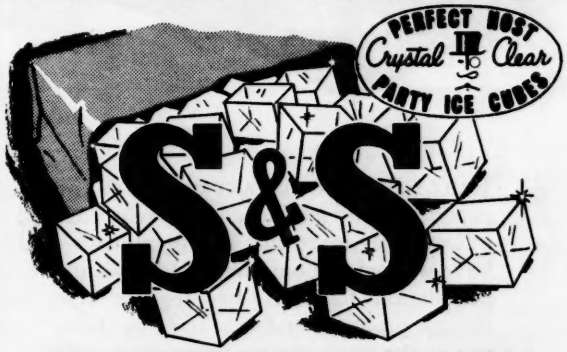

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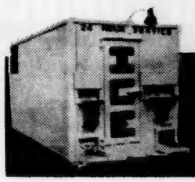

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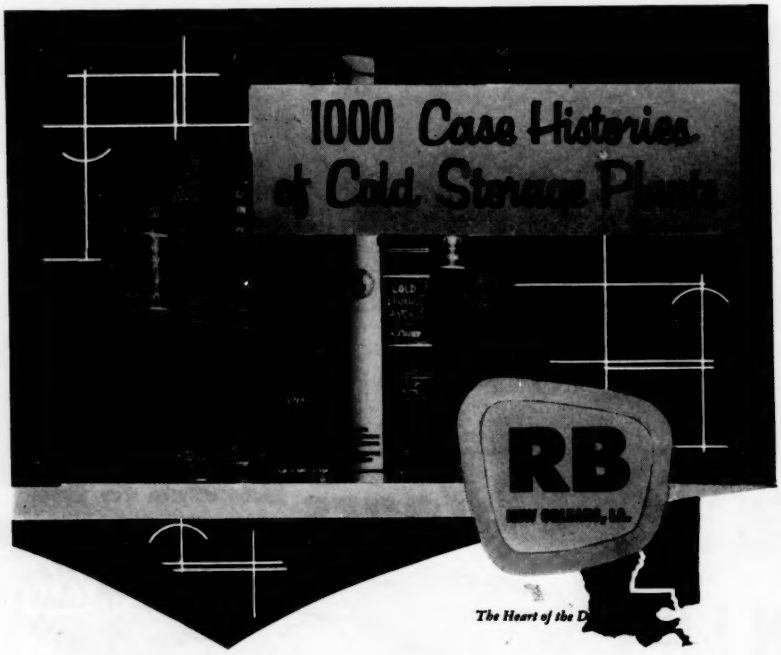
Book Review

MECHANICAL ENGINEERING PRACTICES, Fifth Edition, by Charles F. Shoop, Emeritus Professor of Mechanical Engineering, University of Minnesota, and George L. Tuve, Professor of Mechanical Engineering, Case Institute of Technology. Published by McGraw Hill Book Company, Inc., New York. 471 pages. Price $7.00. For sale by Nickerson & Collins Co., Chicago, Ill.

This is a laboratory reference text for the engineering students, and a reference book for the practicing engineer. Measurement of technical and economic performance of machines and equipment is presented as a major engineering assignment, and attention is called to the precise requirements of the codes and standards sponsored by various professional groups. To keep this fifth edition within a convenient size, material of lesser current value has been deleted and new information of current importance added.

Recent trends, such as the greater use of electrical instruments and transducers and the study of the dynamics of the processes of flow and heat transfer, are reflected. Much new material is included in each chapter. Special emphasis is placed on the latest techniques for mechanical measurements, dynamic characteristics of processes, and automatic control. A new chapter deals with electro-mechanical instrumentation. An important chapter on "Characteristics of Automatic Controls," coauthored by Professor Lawrence G. Siegel, has been added. This material fulfills the need of present-day mechanical engineers for an understanding of process characteristics and systems of control.



REILLY-BENTON COMPANY doesn't sell books. It sells experience and guidance in the selection and application of insulating materials. Representatives of this company have worked in Louisiana and Mississippi cold storage installations for nearly two decades. They know cold storage problems and how to solve them. They can help you in the insulation planning phase of your new cold storage facility. Contact REILLY-BENTON and a qualified, experienced representative will work with you from the blueprint stage to completion.

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Book Review

SUPERVISORS SAFETY MANUAL, published by The National Safety Council, Chicago, Ill. Illustrated. 354 pages. Price $6.25 to nonmembers; $3.25 to members. For sale by Nickerson & Collins Co., Chicago, Ill.

Recognizing that the supervisor is a key figure in the safety program of any plant, the National Safety Council has published a book directed to the needs of the supervisor and suitable for use as a text in group training. Each chapter of the book, written by a specializing engineer, is virtually a self-contained unit covering all phases of the safety program. Accompanying the manual is an instructor's guide designed to help the instructor organize a class and subject matter and to provide some ideas on good teaching methods. This book undoubtedly will prove to be a valuable tool for the promulgation of safety principles and ideas.

Institute Paper Reviews Refrigeration in Australia

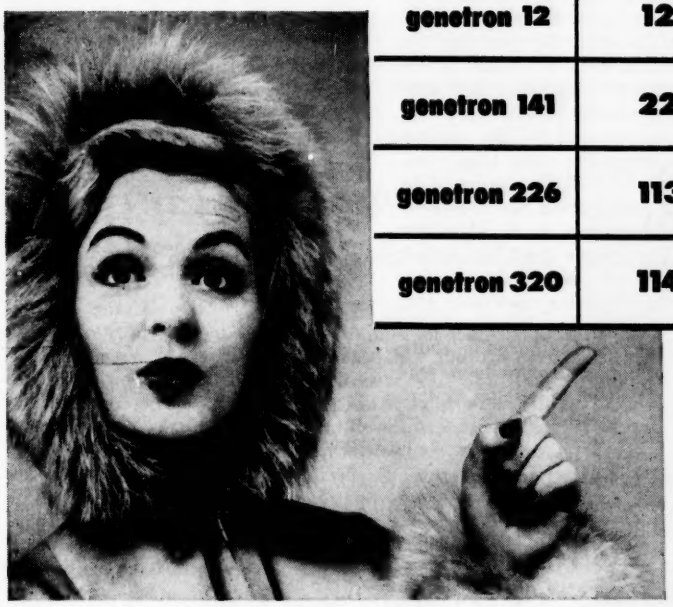
A PAPER on the centenary of refrigeration in Australia was presented at a meeting of the Victorian Division of the Australian Institute of Refrigeration, June 13 by F. M. Goodman. The paper reviewed the progress in refrigeration in that country, starting 117 years ago, in 1839, when the first cargo of natural ice was shipped from Boston, U.S.A. Another historic event occurred in 1855 when James Harrison pioneered the production of artificial ice with the first refrigerating compressor, which used ether as a refrigerant. He also pioneered in the freezing of meat for export. The review continues with sketches of later refrigerating machinery, the frozen meat trade, refrigeration of dairy products and other perishables, and the rise of industrial refrigeration.

ANNOUNCING···

Revised Code Numbers for genetron® SUPER-DRY REFRIGERANTS

. . . in the interest of standardizing refrigerant terminology and nomenclature

PRESENT GENETRON CODE NUMBER	CODE NUMBER TO BE USED EFFECTIVE JAN. 1	COLOR-CODE	REFRIGERANTS
genetron 11	11	ORANGE LABEL	TRICHLOROMONOFLUOROMETHANE
genetron 12	12	WHITE LABEL	DICHLORODIFLUOROMETHANE
genetron 141	22	GREEN LABEL	MONOCHLORODIFLUOROMETHANE
genetron 226	113	PURPLE LABEL	TRICHLOROTRIFLUOROETHANE
genetron 320	114A	DARK BLUE LABEL	DICHLOROTETRAFLUOROETHANE



In the interest of helping to standardize refrigerant terminology and nomenclature, General Chemical is adopting the revised code numbers shown above for its "Genetron" Super-Dry Refrigerants, effective January 1, 1957.

These numerical designations reflect recommendations of trade and technical associations throughout the industry which have been working jointly and independently on many standardizations, including a common numerical code system for fluorinated hydrocarbon refrigerants.

The numerals for two of the most widely used "Genetrons"—"Genetron" 12 and "Genetron" 11—already conform and, accordingly, are not being changed.

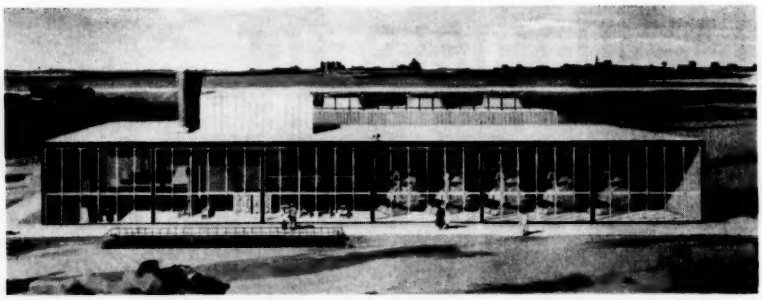
"Genetron" Super-Dry Refrigerants are stocked and recommended by America's leading air conditioning and refrigeration wholesalers. When ordering from them in the year ahead, please use these revised code numbers to designate the "Genetrons" you need.

Allied Chemical

Basic Chemicals for American Industry

GENETRON DEPARTMENT
GENERAL CHEMICAL DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

Cool Air From Heat in Terminal City New York International Airport



The modern power plant for New York International Airport's New "Terminal City" will have on display the world's largest installation of automatic "pushbutton" absorption refrigerating machines. Nine of these units will be lined up side by side in this glass-walled building.

A NEW contract has been placed by the the Port of New York Authority for installing an air conditioning system in the New York International Airport's projected "Terminal City". Contract was awarded to the Carrier Corporation. It will be the world's largest installation of absorption refrigerating units, which use heat to produce cooling, according to Charles V. Fenn, Vice-president, Machinery and Systems Division of Carrier.

Four absorption machines of 700 tons capacity each will be added to the five already on order, bringing the total cooling output to 6,300 tons. Consulting engineer for the system is the New York firm of Seelye, Stevenson Value and Knecht. The installation will provide chilled water for the complete air conditioning of the ten unit terminal buildings to be constructed around a landscaped oval of 655 acres. The refrigeration contract is part of a 90 million dollar program scheduled for completion by 1965.

The water chilling machines installations have had steam as the source of heat energy, Mr. Fenn stated. The units are controlled by a pushbutton providing automatic "stop-go" operation. They have virtually no moving parts and can fluctuate from full to zero load and back to full again with little loss in efficiency.

Housed in a modern utility power house centrally located to all airline stations, chilled water will be distributed through underground pipes in much the same manner as other services. Pipelines will extend nearly half a mile to supply some of the structures. The chilled water mains from the central station will be two feet in diameter.

The absorption machines operate on the principle that evaporation of water produces cooling. Water vapor created in the process is absorbed by a salt solution. As the solution is diluted, it must be continually strengthened. This is done by pumping the weak solution to a generator where steam, hot water, or other hot solutions boil off excess water. The strong solution is returned to the cooling section to repeat the cycle. High pressure hot water will be employed to boil excess water from the absorbent solution, Mr. Fenn said. Thus the same energy source used for winter heating will also power the cooling equipment, permitting operating and installation economies.

The boilers and absorption units will be on public display in a rectangular, glass-wall apparatus center, as shown in above picture.

Air Conditioning Institute

AN AIR conditioning institute at the University of Wisconsin, held November 14-16 at Madison, Wisconsin presented a number of speakers representing industrial concerns specializing in air conditioning equipment. The meeting was directed by the University Extension Division and the College of Engineering in cooperation with the Wisconsin Chapter of the American Society of Heating and Air Conditioning.

The general theme of the institute was a study of water systems and their application in the field of air conditioning. The program was designed for architects, contractors, engineers and other personnel representing manufacturers of air conditioning equipment and accessories.

Florida Ice Convention

THE Anual Convention of the Florida Ice Association was held October 14-16 at the Suwanne Hotel in St. Petersburg. The meeting got off to a radiant start Sunday evening when the Atlantic Company and the Jackson Ice Company were hosts at a gay get-together party. This was followed by three fine business sessions on Monday and Tuesday.

Highlights of the convention included among other things an address by G. L. Rosebrock, vice-president and general manager of the Southern Ice Company, Charleston, S.C. and NAII Divisional President; a fine panel session moderated by B. F. Thomson of Jacksonville and a good safety meeting. NAII was represented by William T. Jobe who also appeared on the program.

In addition to the cocktail party, the delegates enjoyed swimming, a fine water show, a barbecue, and a dance. The convention closed with a colorful luncheon on Tuesday.

The following officers were elected for next year:

President: R. A. David, Jacksonville.

First Vice-President: J. Don Kane, St. Augustine.

Second Vice-President: B. F. Thomson, Jacksonville.,

Treasurer: Herman Osteen, Miami.

Executive Secretary: Muriel Washburn, Jacksonville.

Neoprene Rubber Storage

RECENTLY Geo. Crane of Birmingham Ice & Cold Storage Co., wrote NARW about receiving for cold storage the raw material for use in the manufacture of Neoprene. The B. F. Goodrich Co. is the customer. Neoprene is a synthetic rubber with specialized uses, as in hose used for petroleum products. The purpose of cold storage (45 F and about 75 percent rh) is to retard breakdown prior to manufacture into Neoprene that is, to control the rate of chemical reaction.—TRRF Bulletin.

New NARW Members

APPLICATIONS from the following companies for membership in the National Association of Refrigerated Warehouses have been accepted: Standard Ice Company, Little Rock, Ark.; City Ice Company, Gainesville, Ga.; Collins Ice & Coal Company, Grand Rapids, Michigan; Frostyaire For Frozen Foods, Inc., Searcy, Ark., and Jackson Cold Storage & Warehouse, Jackson, Mich.

(Continued from page 39)

Tulsa Starts Fall Program with Watermelon Party

TULSA—Like many NAPRE chapters, Tulsa starts its fall program with a family social. On August 14 the chapter held its annual watermelon feed at the picnic grounds of Tulsa Ice and Cold Storage Company (a Division of City Products Corp.). Children enjoyed movies and competed for some valuable prizes, while the grown-ups contented themselves with a little Bingo.

Candid cameramen got chapter president Laurence Wagner, past national president George Koebne, and past chapter president Henry Turner finishing up their watermelon. Bob Meng is the dispenser rigged up in white apron in the background.

This Oklahoma chapter resumed its fall meetings on September 3 with a business affair where the educational program and the membership drive for the fall were mapped out. The September 18 meeting was held at the Palmer Supply Company, where the chapter resumed its studies of the refrigeration course.—*Bill Swadley.*

Some watermelon eating participants about to call it a day are (l. to r.) Mesdames Swadley, Turner, Meng; Chapter President and Mrs. Laurence Wagner; Messrs. Bob Meng and Henry Turner. Children are (l. to r.) Lynn Swadley, Johnny Meng, Glen Wagner, "Rusty" Meng.

Florida Reduces Accidents

THE Florida Ice Association reports that its safety program carried on with the help of the Florida Industrial Commission has paid off. Eighty percent reduction in lost time due to accidents. Thirty-seven percent cut in accident costs.

Canadian Ice Convention

THE Annual Convention of the Canadian Association of Ice Industries was held October 15-17 at the Chantecler Hotel, Ste-Adele, Quebec. The meeting opened Monday evening with a social hour, dinner and a full evening of entertainment including a splash party, games and dancing.

The highlights of the business meetings were two addresses, "Have you Tried" by George Heath, manager, Oscar Mayer Ice Service, Madison, Wisconsin, and "We Stand Together" by Guy W. Jacobs, NAII Executive Secretary. A substantial part of each business session was devoted to a general round-table discussion of topics of interest, all dealing with the making, processing, handling and selling of Ice. These discussions created much interest among the members.

In addition to the first night's entertainment, there was the usual President's dinner with an unusual after-dinner speaker. Other activities included a tour of a fish hatchery and an "Early Bird" breakfast with prizes. The business sessions were particularly realistic business affairs, and the entertainment was enjoyed by all.

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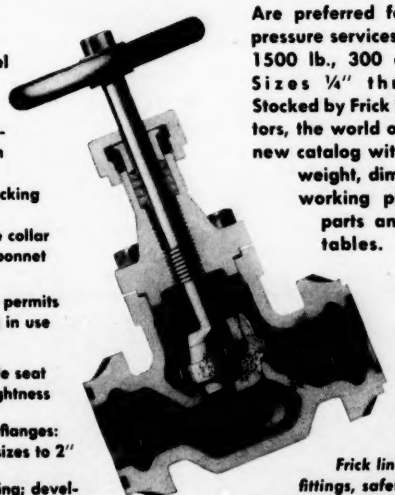

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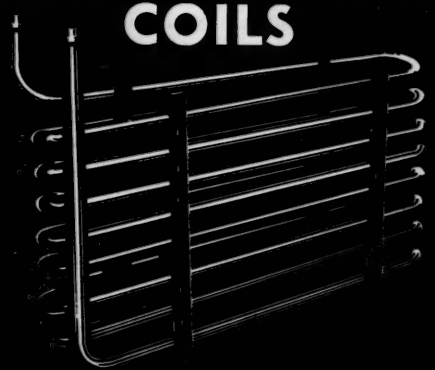

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Sloughing of Skin in Cooked Frozen Snap Beans

A QUALITY problem that occurs in frozen snap beans is the sloughing of the skin of the cooked, ready-to-serve product says Leonora Hohl Strohmaier, Department of Food Technology, University of California, in a paper in Food Research. This phenomenon is not so apparent in either canned or freshly cooked beans but consumer acceptance of the frozen product is adversely affected, the author reports. Gray Singleton in a previous report discussed the skin sloughing problem, among others, and reported variations of time and temperature of blanch not to be successful in solving the problem. He did find a correlation between cavities around the seed and sloughing of the outer skin after freezing. Some varieties, which have such cavities only during the early stages of maturity, sloughed their skins during these stages. Singleton's discussion further indicates that considerable varietal difference exists with respect to this characteristic. W. D. Enzie has pointed out that some varieties slough their skins more readily than others, a factor of importance in evaluating new varieties.

A microscopic study was made to determine where the break which results in the skin sloughing occurs. A sample of fresh market beans was used. One lot was deaerated in formaldehyde acetic acid, ethyl alcohol fixative. Another lot was frozen at 0 F after slicing and steam blanching for two minutes in the usual manner. After storage for a few weeks a portion of these frozen beans was thawed, deaerated, and fixed as the fresh ones had been. Another portion of the same frozen beans was cooked for 12 minutes in boiling water and then similarly fixed.

The results are shown in a series of illustrations. The first shows a transverse section of mature fresh snap beans with normal structure; the second shows where the break occurs after freezing and thawing, in the region of the largest thin-walled parenchyma cells just outside the vascular region; the third of the cooked frozen product shows the same break, the only difference being that it occurred in about the middle of this large-celled region. Cooking caused the cells to shrink a little.

A transverse section of a very young snap bean just after blossom drop shows that all the future tissue regions were blocked out at this early stage of development. For the final illustration a transverse section of an ovary of snap bean blossom. This series of photomicrographs shows that the break occurs in the layer of large thin-walled parenchyma cells outside the vascular region. The tissue regions involved are delineated at or before the blossom stage.

Refrigeration Grants To Purdue Research Center

PURDUE University has acknowledged receipt of two free grants, totaling $18,000, to support its newly-formed national center for research on refrigeration and climate control and their effects on humans and animals. Both gifts, to be used over Research Center's life, are for $3,000 per year.

One of the two initial grants came from Addison Products Company, Addison, Mich., manufacturers of packaged central system air conditioning. The other grant came from Revco, Inc., of Deerfield, Mich., which pioneered in the manufacture of built-in refrigeration units and custom-made frozen food chests, refrigerators, etc.

Made possible by an initial grant of $300,000 from Tecumseh Products Company, Tecumseh, Mich., manufacturer of air conditioning and refrigeration compressors, the Purdue Center for Refrigeration and Climate Control has begun a major fund campaign reaching for a total of over $1,000,000 with which to complete the necessary building and instrumentation and to carry out the initial three-year research program. Major efforts will be to provide trained manpower and basic information about refrigeration.

Complaint Filed Against Ice Substitute

THE FREEZIST Corp., of America, 118 Cole St., Dallas, Tex., has been charged by the Federal Trade Commission today with misrepresenting the quality of the products, "Mister Ice," a cooling agent. "Mister Ice" consists of a can containing certain chemicals which, after having been placed in the freezer of a refrigerator, is to be used as a cooling agent in such things as portable ice boxes.

According to the complaint, the company has advertised in newspapers and other promotional media that a can of "Mister Ice" is equivalent to three times as much regular ice and that the product, as well as the equipment and materials used to manufacture it, are patented. These claims are not true, the complaint alleges, nor is the claim that millions of this product have been sold.

The complaint concludes that the company's advertising misleads and deceives the public in violation of the FTC Act. Named in the complaint is Ledger D. Veazey, an officer of the company. The parties were granted 30 days in which to file answer to the complaint. A hearing is scheduled December 20 at Dallas, Texas, before an FTC hearing examiner.

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Special features

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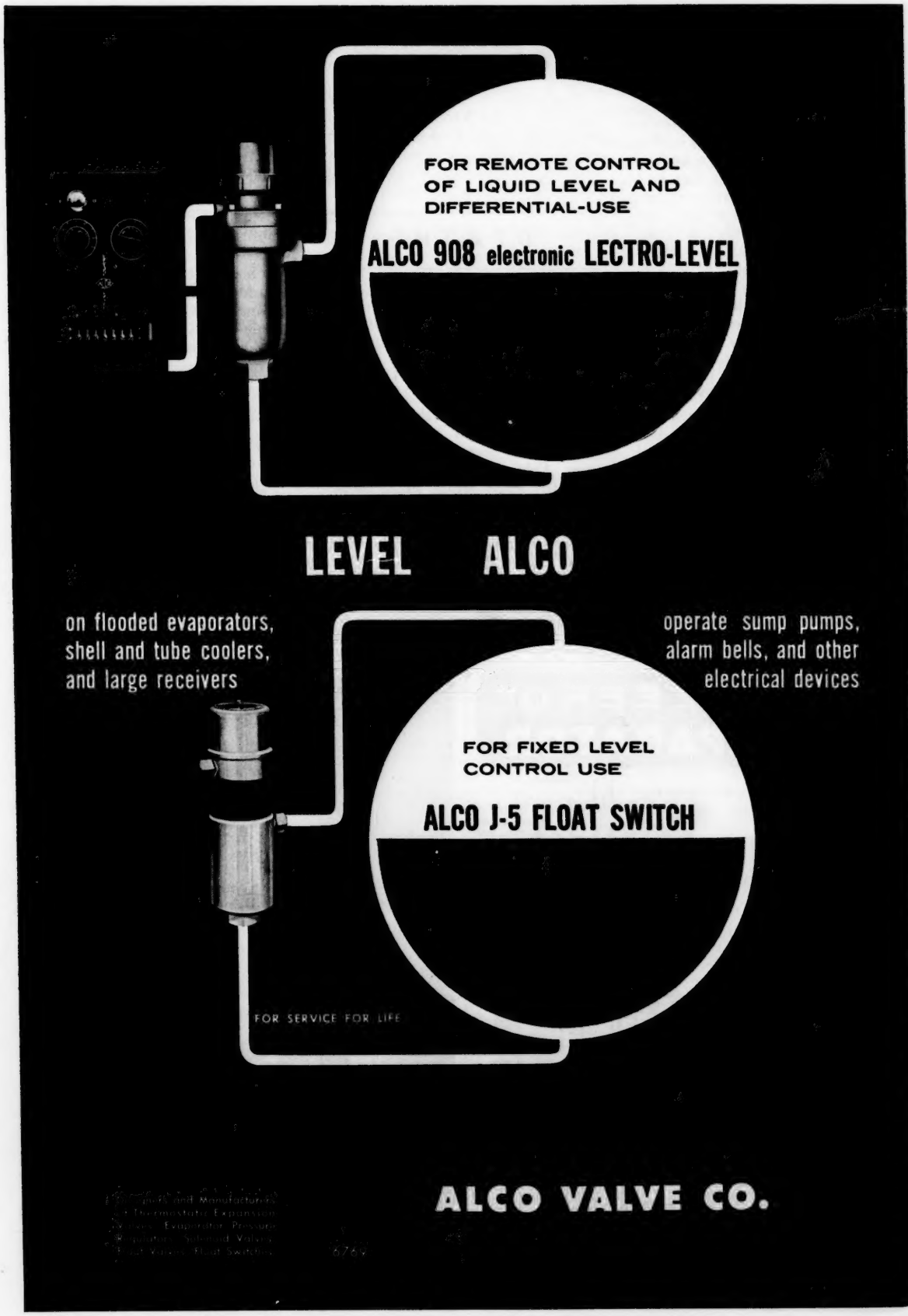
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DIFFERENTIAL-USE
ALCO 908 electronic LECTRO-LEVEL
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and large receivers
operate sump pumps,
alarm bells, and other
electrical devices
FOR FIXED LEVEL
CONTROL USE
ALCO J-5 FLOAT SWITCH
FOR SERVICE FOR LIFE
ALCO VALVE CO.

News of PEOPLE

Moss Turns to Consulting

IN an announcement made November 1, 1956, J. F. (Jim) Moss, Dallas, retired one year ago by York Corp., informed the trade that he is now engaged in his own consulting business. He is located at 4137 University Boulevard, Dallas 5, Texas. Major engineering interests of the new consulting firm will be with industrial refrigeration projects, ice making and air conditioning. Moss will also include appraisal work in connection with similar plants.

One of the first clients of the new firm is located outside the United States. According to Moss, this client is doing an exceptionally good contracting business and has need of complete ice making plants and such unitary items as compressors, power units, gas engines, motors, condensers, receivers, etc. Although his client has placed a considerable amount of used equipment, Moss indicates that they are not interested in machinery other than that which is in condition to operate immediately with little or no overhauling.

Moss is a member of the Dallas Chapter, NAPRE, and formerly instructed refrigeration classes in that chapter.

LAWRENCE S. MARTIN, secretary-manager of the National Association of Frozen Food Packers, has been elected president of Association Executives, an organization composed of secretaries of trade associations.

DEATHS

William A. Moore

THE DEATH of William A. Moore, former secretary and general manager of the New Orleans Cold Storage & Warehouse Company, Ltd., occurred October 16, at Metairie Hospital, New Orleans. He was 64. Mr. Moore, a native of New Orleans, had been with the New Orleans Cold Storage & Warehouse Company since before 1922. He retired two and a half years ago because of ill health. He was a member of the Chamber of Commerce, the Lions Club and International House. During World War II, he was food service consultant for the Fourth Army.

WILLIAM E. CASH, Weston, Mo., owner of the Weston Coal, Grain and Ice Company, died October 20 at a St. Joseph hospital. He was 66. Mr. Cash had been owner of the company since 1939.

EDWARD J. CLARK, chief engineer of the Arctic Ice & Cold Storage Co., Buffalo, NY, died of a heart attack October 21. He was 61. Mr. Clark had been employed by the cold storage firm 15 years.

WILLIAM R. ORROK who had operated his own ice and coal company at Kearney, N. J. for fifty years before retiring in 1951, died October 8 after a long illness. He was 78. Born in New York, he had lived in Kearny for 75 years.

JOSEPH GIBBS ARNALL, president of the Newman Ice Company, Newman, Ga., and father of Ellis Arnall, former governor of Georgia, died September 17 after an illness of five months. He was 74.

H. C. WANTLAND, co-owner of the B & W Ice Company, Columbia, Tenn., died October 9 at Maury County Hospital. Mr. Wantland had been hospitalized since August 29 when he was injured in a traffic accident.

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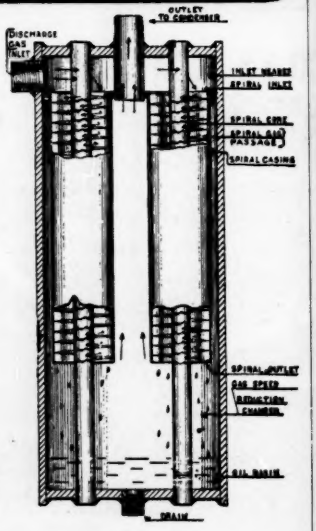
OIL SEPARATOR

Stops oil from entering condenser receiver and low side

Allows operation as originally intended. Simple in operation — no parts to wear out — no screens, metal wool or any close screens to clog, raise discharge pressures and cut down capacity.

When used in connection with air compressors, water is also separated with the oil.

Made in 12 sizes, ½" to 6".



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AUTOMATIC ICE VENDORS
Available in all sizes — with any combination of bag or cake conveyors. The investment is surprisingly low!
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Write today for prices and details. Dept. IR

REFRIGERATION ENGINEERING COMPANY
MONTGOMERY • MINNESOTA

USDA Buys Turkeys to Help Producer Prices

FROZEN turkey purchases amounting to 4,519,000 pounds were made in mid-October by the U.S. Department of Agriculture under the special buying program to help producer prices during the heavy marketing season for this year's record turkey crop. Purchases since first buying in late September now total 10,340,000 pounds.

Price ranges per pound for the week's purchases, week beginning October 15, by geographical regions and number of carlots (average of 30,000 pounds) for each region follow: Northeast 39.49 cents for two carlots; Southeast 39.25 to 39.50 cents for 16 carlots; Midwest 38.22 to 38.50 cents for 57 carlots; Southwest 38.40 to 38.50 cents for 30 carlots; and Western 37.32 to 37.50 cents, except 37.95 to 38.00 cents in Utah, for 48 carlots. All prices are on a per pound f.o.b. basis and the overall range was from 37.32 to 39.50 cents per pound. In making awards, consideration was given to area price variations in relation to transportation costs for distribution. In total, bids were received from 33 bidders who offered a total of 6,349,000 pounds.

Approximately $1.7 million of Section 32 funds were expended for purchases with the overall expenditure to date amounting to approximately $4 million. Delivery of the turkeys purchased were during the week beginning November 5. These turkeys will be distributed for use in the School Lunch Program.

Carrots in Cold Storage

EXTENSIVE field and storage investigations are underway at the New York State Experiment Station, Geneva, N. Y., in an effort to find the answer to the problem of what makes carrots better, which has baffled the food processing industry for the past several years. A progress report on the findings of Cornell and State University vegetable crops specialist J. D. Atkin has just been published by the Experiment Station.

"The problem of bitter carrots has become very serious to the entire carrot industry in New York and other carrot-growing areas within the past few years," comments Doctor Atkin. "The results of studies begun in 1953 are recorded but are not regarded as a solution to the problem and research is being continued," he says.

The off-flavor that develops in carrots after harvest has been called "hot", "quinine-like", "soapy", "bitter", and other like terms. Thus far no carrots tested at harvest time have shown any bitterness.

"Carrots rated more than just slightly bitter have been found only after refrigerated storage and never after common storage," continues Doctor Atkin. "Very little difference, if any, with respect to bitterness has been noted between strains and varieties, although extreme differences may be found between individual roots of the same variety." During the 1953 and 1954 growing seasons, carrots grown on muck and sandy soils developed bitterness to a considerably greater extent than those grown on upland loam soils.

"The fact that carrots turn bitter in cold storage and not in common storage indicates that even if they are predisposed to turn bitter, they will actually turn bitter only under certain storage conditions, indicating that bitterness is due to an interaction of environmental conditions both before and during storage," concludes the Station scientist.

COMING CONVENTIONS

CHICAGO DISTRICT ICE ASSOCIATION
December 12, 1956
Drake Hotel, Chicago, Ill.
Wm. Strauss, Secretary

NATIONAL ASSOCIATION FROZEN FOOD PACKERS
January 6-10, 1957
Fountainbleau - Eden Roc Hotels, Miami Beach, Fla.
Lawrence S. Martin, Secretary-Manager

INDIANA-OHIO-MICHIGAN ICE ASSOCIATIONS
February 25-27, 1957
Detroit-Leland Hotel, Detroit, Mich.

INTERNATIONAL HEATING AND AIR CONDITIONING EXPOSITION
February 25 - March 1, 1957
International Amphitheatre, Chicago, Ill.

NORTH CAROLINA ICE ASSOCIATION
March 18-19, 1957.
Washington Duke Hotel, Durham, N. C.
Lewis H. Powell, Secy-Treas.

AMERICAN WAREHOUSEMENS ASSOCIATION
April 1-5, 1957
Chalfonte-Haddon Hotel, Atlantic City, N. J.
Wm. Dalton, Secretary

NATIONAL ASSOCIATION REFRIGERATED WAREHOUSES
April 1-5, 1957
Chalfonte-Haddon Hotel, Atlantic City, N. J.
Wm. Dalton, Executive Vice-President

AMAZING BROWN VENDOR

REVOLUTIONIZES AUTOMATIC ICE VENDING!

- SENSATIONAL "FOOL-PROOF" VENDOR DISPENSES CUBES, CRUSHED, PARTY AND BLOCK ICE
- LOWER OPERATIONAL COST • TROUBLE FREE • MORE STORAGE SPACE by design
- RADICAL INVENTION — IT'S NEW, DIFFERENT, PROFITABLE

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135 — 10 lb. Bags AND
60 — 25 lb. Blocks

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For complete details, specifications, prices on this Double Unit and other sizes and models or Special Applications Write, Wire or Phone
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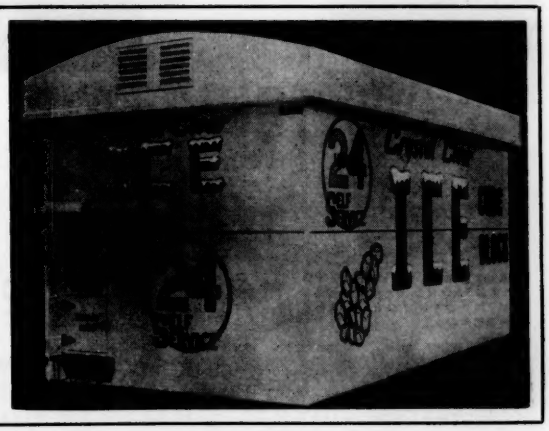


MANUFACTURERS' NEWS

Air Conditioning Needed To Cool Electronic Brain

AIR conditioning is important for an IBM 705 electronic data processing machine put into operation at the New York Life Insurance Company, New York recently. Basic equipment for the air conditioning system are two Trane CenTraVac water chilling units. The "brain", which is said to have been the first of its kind in the life insurance industry, and one of the largest and fastest in the world, is made up of a combination of electronic components constituting a complete data processing unit. Days, even months, will be saved for the company as the brain computes and keeps tab on valuation and dividend records of nearly 4½ million New York Life policy holders.

Largely surrounded by walls of glass, the brain which has a vast electronic storage capacity or "memory", has the ability to calculate at unbelievably high speeds. A central processing unit, which performs calculations in millionths of a second, has the function of comparing several alternatives and selecting the most appropriate, or in other words, it can make logical decisions based upon predetermined or calculated conditions.

Information is fed into the machine from punched cards and/or magnetic tapes. Statistical output can be recorded independently on magnetic tapes, punched cards or printed reports.

Inside the walls of glass where the fast-thinking IBM 705 operates at a speed which makes words or numbers available for calculation in 12 millionths of a second, the Trane CenTraVacs have the dual role of cooling the components of the brain, and maintaining proper humidity control for the protection of the magnetic tapes.

Operation of the built-up air conditioning system begins with the preheating of ventilation air, which is then mixed with return room air. Next, this air is passed through a series of filters to take out any foreign materials which may be brought in with the outside air or picked up by the return air. After going through a water spray where moisture is added for proper humidification, the air is sent over a cooling coil, the coil being supplied with chilled water from the CenTraVacs. The cooled air then moves through a system of ducts.

Part of the air goes to the room itself, and the remainder, directly to the electronic equipment.

Armour Appoints West Coast Distributors

ARMOUR AND COMPANY Ammonia Division has appointed 11 distributors in seven cities on the West Coast and Hawaii to handle its sales of ammonia, R. S. Passmore, division manager, announced. Distributors have been appointed in San Diego, Los Angeles, San Francisco and Hollywood, Calif.; Phoenix Ariz., Salt Lake City, Utah; and Honolulu, Hawaii.

The move puts Armour ammonia sales on a nationwide basis. West Coast operations will be under District Manager W. B. Nicholson with headquarters at 2001 Saybrook Ave., Los Angeles. Plans call for establishment of ammonia cylinder filling stations at Los Angeles and San Francisco.

Worthington Adds Plant

THE acquisition of a West Coast manufacturing plant as a further step in the company's expansion in the year-round home air conditioning field is announced by Worthington Corporation, Harrison, N.J. The facility is located in Alhambra, California and will be operated as the Western Air Conditioning Division of Worthington. Its products will include warm air furnaces and air handling equipment for year-round air conditioning systems designed to fit the climatic conditions of the western and southwestern states. The plant was acquired from Royal Jet, Inc. in exchange for Worthington common stock.

ICE-A-TERIA EQUIPMENT

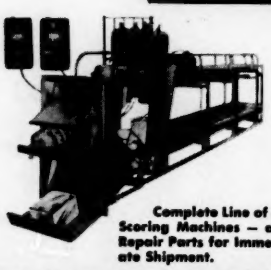
SPEEDS PRODUCTION — CUTS OPERATING COSTS — INCREASES SALES

BAGGER-WEIGHER

MODEL 150-B

MODEL 300

AUTOMATIC VENDING STATIONS and VAULT VENDORS FOR EVERY PURPOSE.

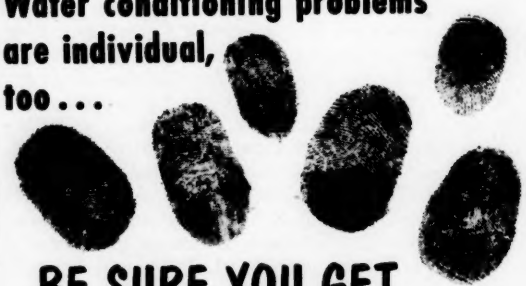


Complete Line of Ice Scoring Machines — and Repair Parts for Immediate Shipment.

PERFECTION ICE SCORING MACHINE COMPANY

P. O. BOX 2140, FORT WORTH, TEXAS • ED5-1258

Water conditioning problems are individual, too . . .



BE SURE YOU GET THE WRIGHT ANSWER

While each water conditioning problem is different, they all have one thing in common: if not solved properly they can be costly in terms of maintenance time and production losses.

With the Wright Water Conditioning Service, your water conditioning is treated as an individual problem from start to finish. Without obligation on your part, Wright will make a scientific laboratory analysis of your problem, then submit a written proposal for its solution. After you adopt our recommendation, Wright will maintain a constant field and laboratory check to insure proper performance. Write, wire or call today.

HAVE YOU TRIED WRIGHT'S NEW FUEL OIL CONDITIONER? Here's a new Wright development that eliminates sludge in oil storage tanks . . . keeps screens and burners clean . . . insures maximum combustion efficiency. Write for complete details TODAY!

Wright CHEMICALS

WRIGHT CHEMICAL CORPORATION

GENERAL OFFICES AND LABORATORY

633 WEST LAKE STREET, CHICAGO 6, ILLINOIS

Offices in Principal Cities

• Softeners, Filters and other external Treating Equipment

• Nelson Chemical Proportioning Pumps

Arthur D. Little, Inc. at Los Angeles

A LOS ANGELES office of Arthur D. Little Inc., was opened recently. The announcement stated that this firm, which pioneered in ultra-low temperature test equipment and cryogenics makes all ADL research and consulting services now directly available to the Los Angeles area and southwestern states. Dr. Benjamin S. Mesick is technical director of the new division. The office and laboratory is located at the Roosevelt Building, Room 452, 727 West Seventh Street, Los Angeles, 17, California. The parent firm is located in Cambridge, Mass.

Creamery Package Opens New Branch

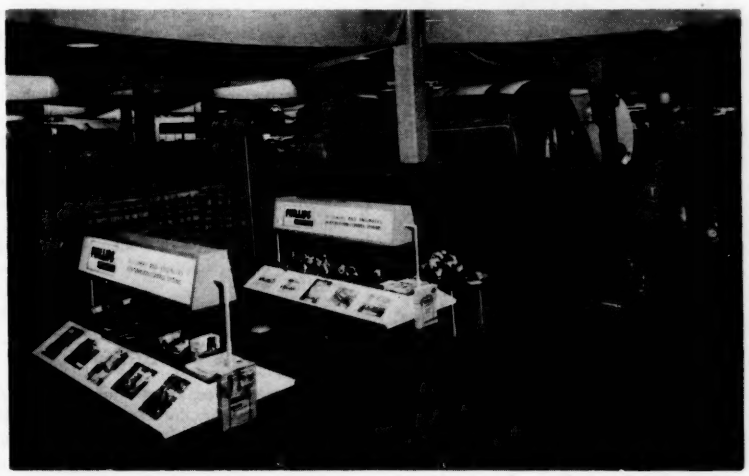
S. T. Memory

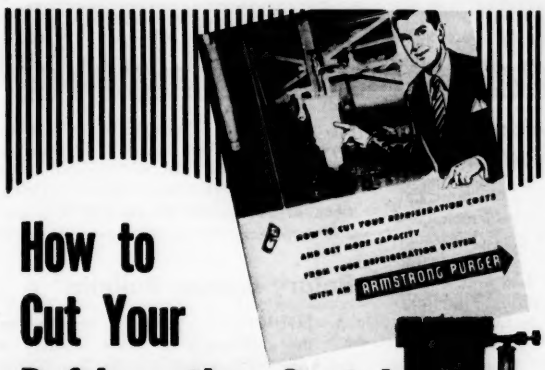
BETTER and faster service for its many customers in North and South Carolina is assured by The Creamery Package Mfg. Company in announcing the opening of a new branch and sales service warehouse at 215 Foster Avenue, Charlotte, N. C. The new warehouse will carry a complete stock of equipment and supplies to meet dairy plant needs. Physical layout has been particularly designed for most efficient handling of orders.

Supervising and activities of the Charlotte branch warehouse will be S. T. ("Tom") Memory, assistant manager of Creamery's Atlanta branch. Mr. Memory has a broad engineering background and is thoroughly acquainted with the mechanical end of plant operations. Providing information and help on refrigeration and other maintenance problems will be part of the complete service offered through the Charlotte warehouse.

Phillips at Dairy Show

AMONG the many firms participating in the annual Dairy Industry Supply Association show at Atlantic City October 29 through November 22 was the H. A. Phillips Co. of Chicago. In addition to the Phillips line of flow control equipment, the firm displayed a model of the Phillips type "G" liquid return system which has proven so popular in the dairy field.





How to Cut Your Refrigeration Costs!

One Armstrong automatic purger can do this for your refrigeration system:

- Cut Power Costs
- Increase Capacity
- Cut Cooling Water Consumption
- Save Refrigerant
- Reduce Labor Costs

Bulletin 2211 tells the complete story of how an Armstrong Forged Steel Automatic Purger benefits you and your refrigeration system. This four page bulletin is free, a postcard brings it to you. Send for it today, write:

ARMSTRONG MACHINE WORKS
860 Maple Street, Three Rivers, Mich.
Satisfaction Guaranteed!

Armstrong Forged Steel Purgers . . . they're AUTOMATIC!

OHIO SPECIAL ICE CANS

WELDED — RIVETED

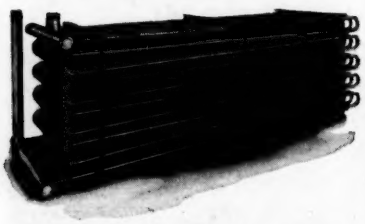
ICE CAN GRIDS

Industrial Trucks

and Trailers

THE OHIO GALVANIZING & MFG. CO.
NILES OHIO

REMPE
PIPE BENDS AND COILS FOR REFRIGERATION
ALL MATERIALS
Stainless Steel, Copper, Steel
FOR AMMONIA & FREON



Headered evaporator coil for liquid cooling or low temperature blast freezing. Also suitable for use with low temperature brine.

Rempe Coils are accepted in the industry as quality equipment that gives long service without maintenance. Over 50 years experience in the coiling and bending of pipe is your assurance of quality workmanship.

Send details for price

REMPE COMPANY
348 N. Sacramento Blvd., Chicago 12, Ill.

VAN RENSSELAER
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ENGINEERS
COMPLETE PLANT DESIGNS INCLUDING BUILDING AND EQUIPMENT
11 PARK PLACE NEW YORK 7, N. Y.

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& ASSOCIATES
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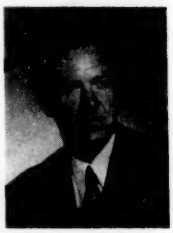
112-114 West 42nd St. New York City 36
Industrial Power Plants
Refrigeration and
Cold Storage Warehouses,
Reports, Appraisals and Management

Vilter Appoints Harvey New Sales Representative



Walter H. Harvey

THE VILTER MANUFACTURING COMPANY announces the appointment of Walter H. Harvey as a sales representative. Mr. Harvey will work out of the firm's Cincinnati, Ohio office with Cincinnati District Manager, L. H. Fischer. His appointment provides Vilter with more complete representation to handle the increased business volume from the area.

Mr. Harvey has a record of over twenty years experience in refrigeration and air conditioning. Prior to joining Vilter he served as assistant chief engineer of the French Bauer Dairy of Cincinnati, Ohio. He also spent nine years as division chief engineer of National Dairy Products Company of Cincinnati. For the past nine years he has been an active member of both the Cincinnati chapters of the ASRE and NAPRE.

Presstite-Keystone Adds Production Facilities

THE acquisition of additional manufacturing facilities for the St. Louis plant is announced by the Presstite-Keystone Engineering Products Company of St. Louis, manufacturer of sealing compounds and paving products for a wide range of construction and industrial applications. The new property covers approximately four acres in the Central Industrial Drive area.

Purchased basically for the increased production of the company's joint sealing compound for jet airfields, the expansion includes a large two-story manufacturing building, a smaller auxiliary manufacturing building, three 10,000 gallon blanding tanks, three 10,000 gallon raw material storage tanks, as well as rubber mixers, powder grinders and mixers, and other necessary equipment. Modern production techniques will be utilized throughout, including accurate metering of component ingredients and semi-automatic operation. Presstite-Keystone markets "Enamelite" for vapor-sealing and adhering rigid-type low-temperature insulations to building structures.

Voss Representative Relocates Warehouse

ERSKINE Engineering Products Co. announced on November 1st their new location in Chicago at 1536 East 87th Street. This firm, representing the J. H. H. Voss Co. is headed up by Erskine H. Franklin, as Associate NAPRE member. In addition to the Voss valve line for air, gas and ammonia compressors, the Erskine Company handles the Sims, Homestead and Thomas C. Wilson lines.

CATALOGS AND BULLETINS

New Recold Dri-Fan Condenser Catalog Issued

A NEW Recold Dri-Fan Condenser Catalog (30C6a) for both "Freon" and Ammonia has been issued by Refrigeration Engineering, Inc., of Los Angeles, featuring many new additions that were not included in the previous catalog. Highlights of the new catalog are: Inclusion of data for selection of Dri-Fan Condensers as an evaporative water cooler; information on how to select and size multi-circuits; material showing the use of hot-dipped galvanized modulating dampers to avoid low head pressure due to air temperature drops, or reduction of load on condenser.

Through graphic illustrations, the catalog points out the unique characteristics of the Recold Dri-Fan Condenser. A chart in the catalog concerning the selection of an evaporative water cooler gives a quick graphical selection of proper unit for any specific load condition. A head loss chart is included to aid in proper selection.

The multi-circuit material shows the versatility of Recold units, and the possibility of using half circuits to get almost any system combination needed without going to larger size units to insure complete capacity in all circuits. In the section devoted to hot-dripped galvanized modulating dampers, explanation of control of head pressure is given. Also included is capacity tables, dimensions, fan tables, information on desuperheat coils and typical specifications for ammonia, F-12 and F-22 Refrigerant condensers.

Rotary Booster Bulletin

A FOUR-PAGE, two-color bulletin on the application of rotary boosters to two-stage refrigerating systems is available from Freezing Equipment Sales, Inc., York, Pa. Illustrating how to increase freezing capacity, or lower temperatures, without increasing total connected horsepower or raising unit power cost, the bulletin describes FES-Fuller Booster operating characteristics under many conditions. Among the representative installations described are: Spreckels-Russell Dairy Co., Ltd., San Francisco, Calif.; Penn Dairies, Lancaster, Pa.; Plantation Foods, Inc., Miami, Fla.; National Ice and Cold Storage Co., Oakland, Calif.; Koontz Creamery, Westminster, Md.; and the food freezing plant of Dulany & Son, Inc., Exmore, Va. Included in the bulletin are seven photographs, three drawings, and a table. The table graphically outlines the results possible by plant conversion from a one-stage to a two-stage refrigerating system.

New Bulletin on Liquid Ammonia Return Systems

AN 8-PAGE bulletin completely describing the function of Phillips Liquid Ammonia Return Systems in refrigeration cycles, is now available. Diagrams with detailed step-by-step explanations show how this basic system and its many variations operate. Basically, the Liquid Return System is an arrangement of automatically operated traps and valves which accumulate ammonia condensation in refrigeration compressor suction lines and return it to the receivers. The return is direct, bypassing the compressor. The bulletin points out the many benefits of this return system: how to increase compressor efficiency, save "lost" refrigeration caused by "slop-over" (unused liquid ammonia), prevent compressor damage, speed defrosting, and increase peak capacity of evaporators.

Brochure Describes Refrigeration Specialties

A BROCHURE on industrial necessities, including three items of special interest to industrial refrigeration has been issued by The Berna Corporation, Garwood, N. J. The text is devoted solely to technical ramifications with regard to each product and the purposes for which they are intended. The products of interest to the refrigeration industry include: Berna Descaler for descaling and desliming ice makers, cubers, flakers and other equipment where water is used; Berna De-iser for de-icing surfaces which freeze over; Drifreeze for removing moisture from freon type, methyl chloride or propane systems; Sarine for salt water inhibition.

New Booklet Describes Jamison Quality

THE skills, craftsmanship and quality that go into the manufacture of a cold storage door are described in pictorial detail in a new booklet published by Jamison Cold Storage Door Company, Hagerstown, Maryland. Entitled "An Open and Shut Case of Quality", the highly illustrated brochure briefly describes the human and mechanical ingredients that are involved in the design and production of doors for all types of industries. It discusses materials, methods, equipment, and skills . . . showing in large pictures different door products in key stages of manufacture. Various types of doors are pictured in a broad range of applications. The booklet, resembling Life magazine in size and format, has 24 inside pages.

A Boost For Engineers

THE engineering profession should recognize that engineering is the most glamorous feet-on-the-ground, head-in-the clouds profession on earth and engineers should get out and sell that concept. When so many young people are looking for glamorous jobs, it's strange that engineering, the most glamorous profession on earth should be so short-handed.

So comments Link-Belt News, external publication of Link-Belt Company which also asks if this is not so because engineers don't look objectively at themselves and take for granted their tremendous accomplishments at which others marvel.

"No profession," says Link-Belt News, "has contributed a greater wealth of material accomplishments for the betterment of mankind. Engineers have put their practical mark on almost everything useful in life. They should employ in the selling of their own profession a little of the same practical, creative imagination."

Brunner Stockholders Veto Sale of Company

STOCKHOLDERS of Brunner Manufacturing Co., Utica, N. Y., rejected a proposal to sell the company to Bendix-Westinghouse Automotive Air Brake Co. of Elyria, Ohio. The vote was 304,907 shares in favor and 167,984 against. Not voting were 71,472 shares. The favorable vote was short of the necessary two-thirds.

The meeting of stockholders was told the company will continue with its present set-up and that decisions on what will be done about the company's financial problems will be made later.

Classified Advertising

All classified advertisements are payable in advance. Except for Positions and Help Wanted classifications, this section is reserved exclusively for USED equipment.

RATES: 20c per word; minimum 25 words. $2.00 per line for bold face headings: $15.00 per inch for line listings.

Positions and Help Wanted

WANTED

MANUFACTURER'S REPRESENTATIVES

An old and well established New England producer of an accepted line of Laboratory and Industrial Hygrometric instruments desires manufacturer's representatives. Our product is a leader in its field with an unmatched and unqualified warranty of accuracy and satisfaction for one full year. Customer satisfaction assured. Market trend is one of expansion — general application constantly broadening. For further information reply to Serdex Inc., 91 Cambridge St., Boston 14, Mass.

USED EQUIPMENT—wanted & for sale

WANTED—Used ice plants, all sizes and makes. Write complete details to Box OT-7, c/o Industrial Refrigeration.

FOR SALE — Refrigeration equipment; ice equipment; new, used. Advise us your needs. Use "QUICKSEAL" — stops brine tank leaks; easy, efficient, economical. Born Company, 80 East Jackson Boulevard, Chicago 4, Illinois, WAbash 2-3299.

FOR SALE—Used ammonia equipment and compressors from 3 x 3 to 9 x 9 high speed, also motors. Write Gus A. Regnier Refrigerating Engineering Co., 532 Winchester Ave., P.O. Box 1093 New Haven, Conn.

FOR SALE—20,000 ft. ammonia coils, 45 ft. lengths, 22 ft. lengths; good condition; 50c per foot. Public Quick Freezing & Cold Storage Co., 1741 W. Beaver St., Jacksonville, Fla.

FOR SALE—4x4, 5x5, 8x8 Fricks. 5x5, 8x8 Yorks. 15 ton shell & tube condenser. 7½ and 9x9 York crank shafts. Write E. Niebling, 1546 St. Clair Ave., Mt. Healthy, Cincinnati 31, Ohio.

FOR SALE—500 all steel equipment food lockers, 18" wide and 30" long; guaranteed in excellent condition. Drawers $5.50 each. Door type $4.00 each. Will consider best offer. Connecticut Ice Machine Company, Inc., 7 Madison St., South Norwalk, Conn.

FOR SALE—Baker 10½ x 10½ forced feed lubricated compressor used less than 5 years, 12 x 96 receiver, 10 x 60 oil trap, three 10 x 66 surge drums, combination Alco thermo expansion and solenoid valves, 75 hp., 570 r.p.m. motor. H. Betz, 2917 Tomahawk, Kansas City, Missouri.

FOR SALE—AMMONIA—FREON

1—3-¾x3"—8 cyl. V/W York belt driven ammonia compressor.
1—5¼"x4¼"—6 cyl. V/W York ammonia booster comp.
1—6-¾"x5"—6 cyl. V/W York booster ammonia comp.
1—25 ton Chrysler Air Temp. Freon condensing unit, complete.
1—40 ton General Electric Freon condensing unit, complete.
1—50 ton General Electric Freon condensing unit, complete.
1—50 ton Buffalo Freon evaporative condenser.

ENTERPRISE EQUIPMENT CORPORATION
79 Alexander St. Yonkers, N.Y.
Cable: ENEQCO Phone Yonkers 8-8118-9

FOR SALE

2—10"x10" 2 cyl. Frick D.C. to 100 hp motor.
2—10"x10" 2 cyl. York D.C. to 100 hp motor.
3—9"x9" 2 cyl. York D.C. to 75 hp motor.
1—8"x8" 2 cyl. Frick D.C. to 75 hp motor.
1—7¾"x5" Frick booster.
2—50 ton G.E. Freon condensing units.
1—50 ton Buffalo Freon evap. condenser.
1—6"x6" Frick compressor.
1—5"x5" York compressor.
3—9¼x14" 115 hp Wolverine Diesel engines.
11x22x47" and 11x22x51" ice cans.
Ice plant — 20 to 160 tons.

ENTERPRISE EQUIPMENT CORPORATION
77 Alexander St. Yonkers, N. Y.
Cable ENEQCO Phone: Yonkers 8-8118-9

FINNED PIPE FOR SALE—48 lengths 12' each Made from 2" steel pipe-7" square fins 1½" apart; galvanized. New at only $3.00 per foot. Also 100 steel Hand Trucks. Medium duty; roller bearing wheels. New at $6.00 each. West Side Cold Storage Co., 7 Harrison St., New York 13, N.Y.

FOR SALE
NEW EQUIPMENT — NEVER USED

310-ton York water chilling set-up, complete with 300-hp. motor. Turbo compressor, speed increaser, chiller, condenser, controls, etc.
9x9 York, with 75 hp. syn. motor.
Two 7½x7½Yorks, w/V-belt, 50 hp.
Two 6x6 Yorks, D8 w/V belt drives, 30 hp.
One 5x5 York, D8 w/V-belt drive, 20 hp. with evaporative condenser.

JOHN F. CARSON
A & Venango Sts., Phila. 34, Pa.
GArfield 6-2221

Ice Plants—for sale

FOR SALE—40 ton ice plant; excellent condition. In Central New York State; good location for expansion. No competition. Reason, health. Write Box DC-6, c/o Industrial Refrigeration.

FOR SALE OR LEASE—35 ton ice plant, with shrimp processing facilities. Perfect condition. Located Allemands Louisiana. Ice sales to shrimpers. Supreme Ice Cream Company, Princeton, Ill.

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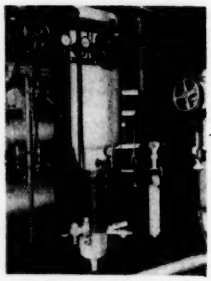

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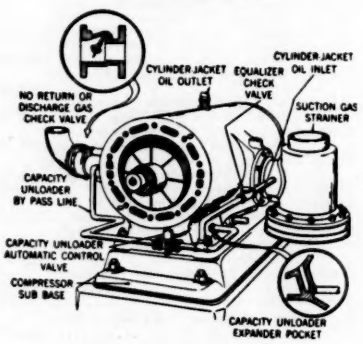
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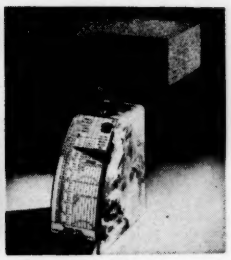

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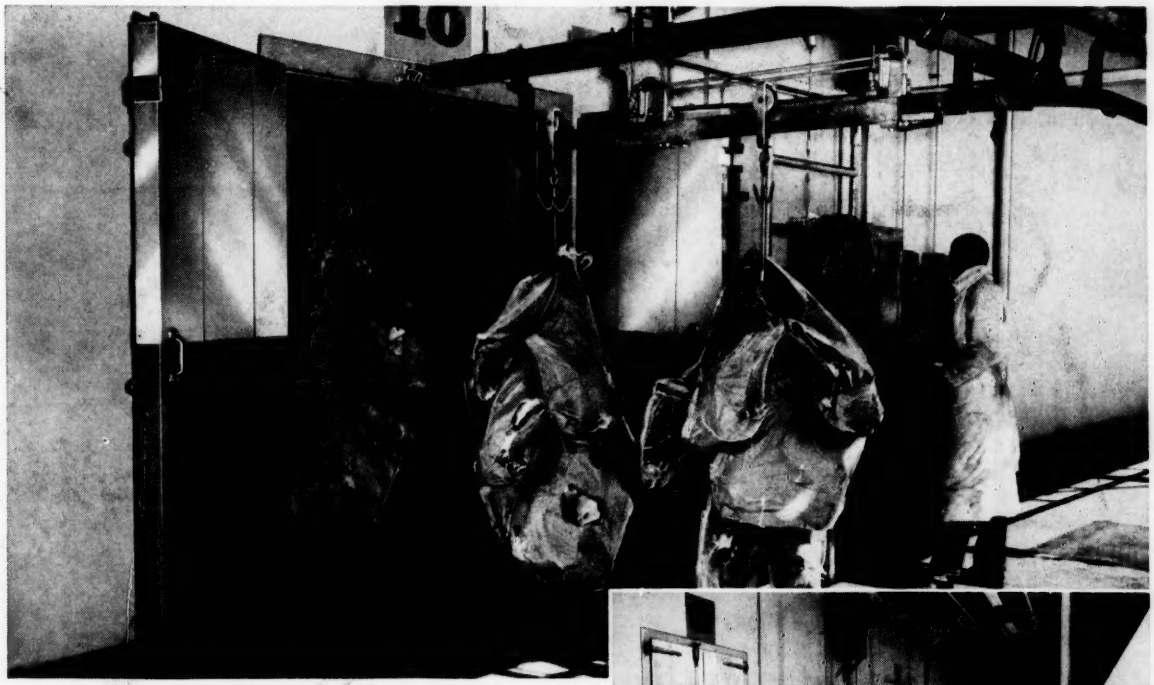

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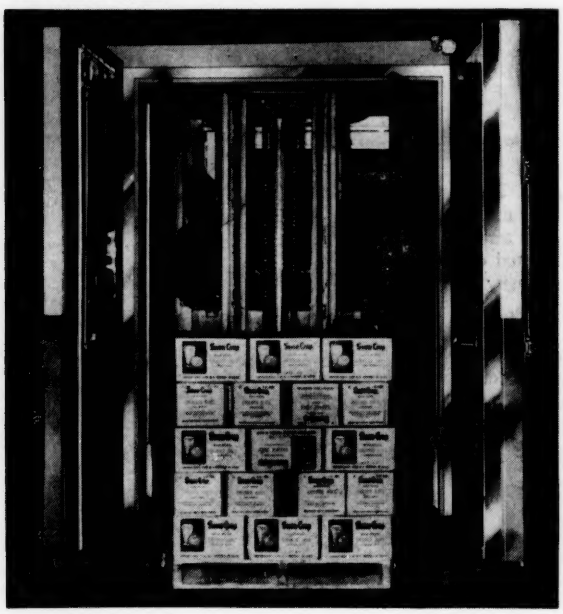

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